

Accessories for Maverick I™ Commercial Packaged Rooftop Systems

Group: **Applied Systems**Part Number: **IM 921**Date: **April 2008**

**Models MPS003A – 020A
3 to 20 Tons**



Note: This manual is a collection of various installation manuals for accessories that may be purchased separately. To print this manual with page numbers showing, choose "Documents and Markups" from the Adobe® Reader® print option settings.

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C7232A,B Sensor and Controller

CARBON DIOXIDE SENSOR

PRODUCT DATA



FEATURES

- Used for CO₂ based ventilation control.
- Models available with LCD that provides sensor readings and status information.
- Non-Dispersion-Infrared (NDIR) technology used to measure carbon dioxide gas.
- Gold-plated sensor provides long-term calibration stability.
- Device provides voltage or current output based on CO₂ levels.
- Models available with SPST relay output.
- Automatic Background Calibration (ABC) algorithm based on long-term evaluation reduces required typical zero-drift check maintenance.

APPLICATION

The C7232 Sensor and Controller is a stand-alone carbon dioxide (CO₂) sensor for use in determining ventilation necessity with HVAC controllers. The C7232 measures the CO₂ concentration in the ventilated space or duct. The C7232 is used in ventilation and air conditioning systems to control the amount of fresh outdoor air supplied to maintain acceptable levels of CO₂ in the space.

SPECIFICATIONS

Models: C7232 Sensor and Controller. A stand-alone carbon dioxide (CO₂) sensor with two jumper-adjustable outputs (one analog and one SPST relay).

C7232A: Wall mount model.

C7232B: Duct mount model.

NOTE: Models are available with or without a 4-digit LCD that indicates the current CO₂ concentration.

Dimensions:

C7232A: See Fig. 1.

C7232B: See Fig. 2.

Sensor Performance Ratings:

Response Time: 2 min.

Carbon Dioxide Sensor:

Operation: Non-dispersive infrared (NDIR).

Sampling: Diffusion.

Range: 0 to 2000 ppm

Accuracy: \pm (30 ppm +2% of reading)*.

* This product complies with Title 24 Part 6, CEC Standard for Residential and Non-Residential Buildings— 2005, when installed according to instructions.

Electrical Ratings:

Power Supply: 24 Vac \pm 20%, 50/60 Hz (Class 2).

Maximum Power Consumption: 3W.

Peak Current (at 20 ms): 600 mA.

Relay:

Configuration: Shipped N.O.

Contact Rating: 1A at 50 Vac/24 Vdc.

Minimum Permissible Load: 1 mA at 5 Vdc.

Linear Analog Output:

Voltage: 0/2-10 Vdc (resistive load greater than 5000 ohms).

Current: 0/4-20 mA (resistive load less than 500 ohms).

Outputs (Jumper Adjustable, see Table 2):

Analog: 0-10 Vdc (Default: 2-10 Vdc, 500 to 1500 ppm).

Relay: Normally Open SPST (Default: Close at 800 ppm).

Ambient Ratings:

Temperature:

Operating: +32°F to +122°F (0°C to +50°C).

Storage: -4°F to +158°F (-20°C to +70°C).

Relative Humidity (non-condensing): 0 to 95 percent.

CO₂ Pressure Dependence: 1.4% change in reading per 1 kPa deviation from 100 kPa.

ORDERING INFORMATION

When purchasing replacement and modernization products from your TRADELINE® wholesaler or distributor, refer to the TRADELINE® Catalog or price sheets for complete ordering number.

If you have additional questions, need further information, or would like to comment on our products or services, please write or phone:

1. Your local Honeywell Automation and Control Products Sales Office (check white pages of your phone directory).
2. Honeywell Customer Care
1885 Douglas Drive North
Minneapolis, Minnesota 55422-4386

In Canada—Honeywell Limited/Honeywell Limitée, 35 Dynamic Drive, Toronto, Ontario M1V 4Z9.

International Sales and Service Offices in all principal cities of the world. Manufacturing in Australia, Canada, Finland, France, Germany, Japan, Mexico, Netherlands, Spain, Taiwan, United Kingdom, U.S.A.

Wiring Connections:

C7232A: 20-gauge cable with six 8 in. leadwires.

C7232B: 20-gauge cable with six 6 in. leadwires.

Mounting:

C7232A: Vertical surface with standard single-gang junction box.

C7232B: Sheet metal duct with a sampling tube.

Automatic Background Calibration (ABC) default: On.

Calibration: This product is factory calibrated. No field calibration is necessary for the life of this product.

Approvals:

CE

Underwriters Laboratories Inc. Listed, File No. E4436

cUL

C7232B: Flammability Rating, UL94-5V

C7232A: NEMA1

C7232B: NEMA3

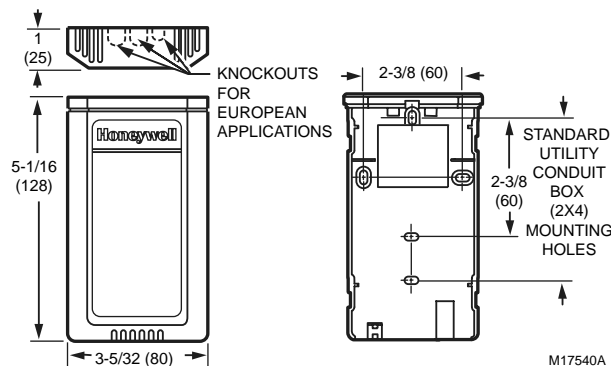


Fig. 1. C7232A dimensions in inches (mm).

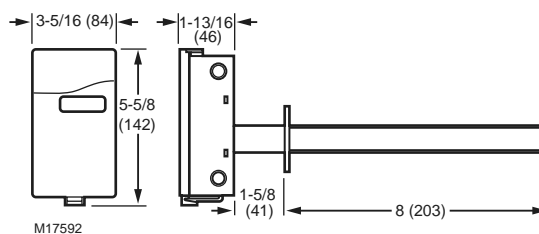


Fig. 2. C7232B dimensions in inches (mm).

INSTALLATION

When Installing this Product...

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application.
3. Installer must be a trained, experienced service technician.
4. After installation is complete, check out product operation as provided in these instructions.

IMPORTANT

All wiring must agree with applicable codes, ordinances and regulations.



CAUTION

Health Hazard.

Improper use can create dangerous situations.

Use in application for sensing carbon dioxide only. For life-safety applications, this device can function only as a secondary or lesser device.



CAUTION

Electrical Shock or Equipment Damage Hazard.
Can shock individuals or short equipment circuitry.

Disconnect power supply before installation.



CAUTION

Equipment Damage Hazard.

Electrostatic discharge can short equipment circuitry.

Ensure that you are properly grounded before handling the unit.

C7232A Cover Removal/Replacement

C7232A Cover Removal (see Fig. 3)

1. Remove button head socket cap screw and set it aside.
2. Insert the head of a small screwdriver into the slot at the center and near the top of the cover.
3. Gently pull the handle down toward the bottom of the device until a small gap between the subbase and the cover appears.

4. Remove the screwdriver and pull the cover straight down until it meets a stop.
5. Pull the cover straight off the subbase.

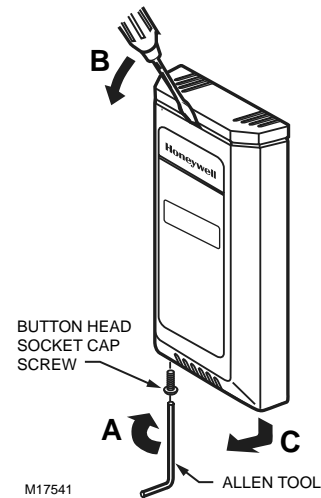


Fig. 3. C7232A cover removal.

C7232A Cover Replacement

1. Feed the wires through the opening in the subbase.
2. Place the cover, with a small gap at the top, flat on top of the subbase.
3. When the cover rests flat on the subbase, slide it straight up until it latches in place.

Location and Mounting

C7232 Sensors mount directly on the wall, sheet metal duct, or a panel. When planning the installation, allow enough clearance for maintenance and service. Mount the sensor in a well-ventilated area.

NOTES:

- Do not install the sensor where it can be affected by:
 - drafts or dead spots behind doors and in corners.
 - air from ducts.

Sensor must be mounted in a location which sees at least one 4-hour unoccupied period per week so that the CO₂ level drops to outdoor levels. Automatic Background Calibration will not work properly in locations without four hours of unoccupied time per week, or where there are sources of CO₂ other than people (breweries, mushroom farms, etc).

IMPORTANT

This sensor is not for use in highly corrosive environments.

Wall Mounting

The C7232 Wall Mount models can be mounted using two or four screws:

1. Remove C7232 cover.
2. Mount the subbase to the wall using washers and two or four screws (not supplied) appropriate for the wall material.

NOTE: When mounting on a junction box, see Fig. 4.

3. Replace the cover.

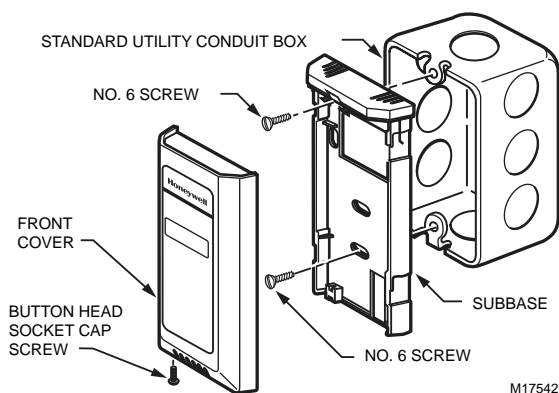


Fig. 4. Junction box mounting (C7232A).

Duct Mounting (see Fig. 5)

1. Place gasket on aspiration tube.

IMPORTANT

Ensure largest tab at tube control end is at the top.

2. Insert tube into duct; attach using screws and washers.

IMPORTANT

Leakage into the duct or the C7232 box cover from the room will skew the sensor readings. Ensure the box cover and duct seal completely.

3. Place O-ring on tube end; mount the control to the tube.

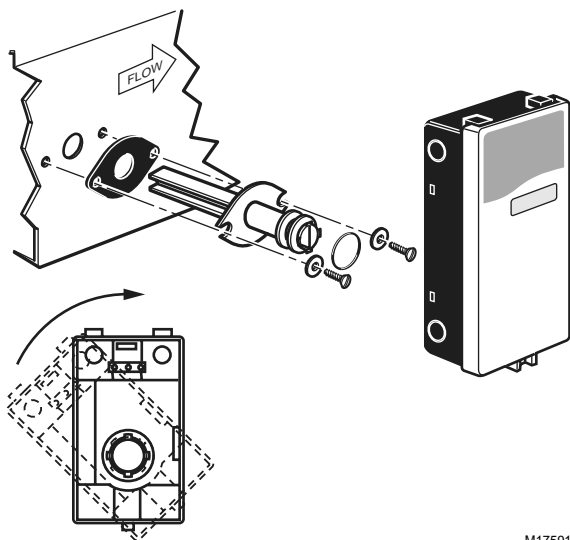


Fig. 5. Duct mounting (C7232B).

WIRING

The factory ships the device with the output default settings shown in Tables 2 and 3. Set the jumpers and wire the device (see Table 1 and Fig. 6).



CAUTION

Electrical Shock or Equipment Damage Hazard.
Can shock individuals or short equipment circuitry.

Disconnect power supply before installation.



CAUTION

Equipment Damage Hazard.
Electrostatic Discharge Can Short Equipment Circuitry.

Ensure that you are properly grounded before handling the unit.

IMPORTANT

1. All low voltage connections to this device must be 24 Vac Class 2.
2. All wiring must comply with applicable local codes, ordinances and regulations.

Table 1. C7232 Wiring Connections (see Fig. 6).

Wire Color	Designation	Function
Red	G+	24 Vac Hot
Black	G0	24 Vac Common
Yellow	OUT1	Analog Output Signal
Brown	M	Analog Output Common
Orange	NO	Relay Output Normally Open
Green	COM	Relay Output Common

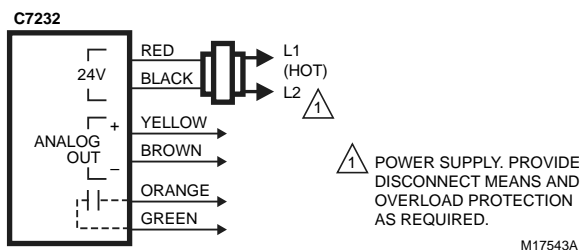


Fig. 6. Wiring the C7232.

Input Signal

The C7232 Sensors have an adjustable range. These ranges are determined by the SW1 and SW2 jumper settings (see Table 2).

Table 2. CO₂ Range Jumper Settings

SW1	SW2	AN (ppm)	Relay ^a (ppm)
On	On	0 to 1000	1000
On	Off	0 to 2000	1200
Off ^b	On ^b	500 to 1500	800
Off	Off	500 to 2000	1200

^a When the level reaches this value, the contacts close; when the level drops 100 ppm below this value, the contacts open.

^b Setting when shipped from the factory.

Output Signal

The output signal can be adjusted for 0/2-10 Vdc or 0/4-20 mA (see Table 3).

Table 3. Output Signal Jumper Settings

AN	OUT	
	0-100%	20-100%
Voltage	0-10Vdc	2-10Vdc
Current	0-20 mA	4-20 mA

Example

For a CO₂ setting of 0-2000 ppm and a voltage output of 0-10 Vdc, the output would be as shown in Table 4 (arbitrary points along the analog curve).

Table 4. 0-10 Vdc Output Example.

CO ₂ Level (ppm)	0	200	400	600	800	1000	1200	1400	1600	1800	2000
Voltage Output (Vdc)	0	1	2	3	4	5	6	7	8	9	10

For a CO₂ setting of 0-2000 ppm and a voltage output of 2-10 Vdc, the output would be as shown in Table 5 (arbitrary points along the analog curve).

Table 5. 2-10 Vdc Output Example.

CO ₂ Level (ppm)	0	250	500	750	1000	1250	1500	1750	2000
Voltage Output (Vdc)	2	3	4	5	6	7	8	9	10

CHECKOUT

Perform a quick test of the unit with the unit powered:

1. Stand close to the unit and breathe air into the sensor.
2. Check the CO₂ level registered by the controller to ensure a strong rise.
3. When connected to a damper in a ventilation system, the controller typically signals an increase in air flow.

NOTES:

- On duct models, remove the screw holding the board in place to view jumper settings on reverse. (See Fig. 7.)
- The CO₂ settings and the output signal settings are independent of each other. 0-100% and 20-100% are simply markings for the OUT jumper settings on the sensor (to differentiate between the two voltage and the two current ranges) and do not refer to or alter the ppm range chosen.

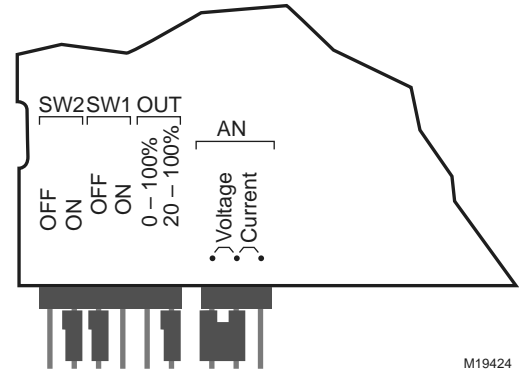


Fig. 7. C7232 default jumper settings.

APPENDIX

IMPORTANT

This page is only for models with date code prior to 0309.

Pre 0309 Date Code Jumper Settings

Input Signal

The C7232 Sensors have an adjustable range. These ranges are determined by the SW2 and OUT1 jumper settings (see Table 6).

NOTE: When choosing analog output, be sure to set the SW1 jumper to the On position.

Table 6. CO₂ Range Jumper Settings for models with date code prior to 0309.

Jumper	Setting	Jumper SW1		Jumper SW2	
		On ^a	Off	On ^a	Off
OUT1 ^b	AN1	X	— ^c	0 to 1000	0 to 2000
	AN2 ^a	X	— ^c	500 to 1500	500 to 2000
Relay Switching ^b		X		800 ^d	1200 ^d
			X	1000 ^d	

^a Setting when shipped from the factory.

^b OUT1 jumper setting does not affect the Relay Switching.

^c The analog output will not work properly when SW1 is Off.

^d When the level reaches this value, the contacts close; when the level drops 100 ppm below this value, the contacts open.

Output Signal

The output signal can be adjusted for 0/2-10 Vdc or 0/4-20 mA (see Table 7).

Table 7. Output Signal Jumper Settings for models with date code prior to 0309.

AN1 and AN2 (set both the same)	OUT	
	0-100%	20-100%
Voltage	0-10Vdc	2-10Vdc
Current	0-20 mA	4-20 mA

NOTES:

- On duct models with date code prior to 0309, remove the screw holding the board in place to view jumper settings on reverse. (See Fig. 8.)
- The CO₂ settings and the output signal settings are independent of each other. 0-100% and 20-100% are simply markings for the OUT jumper settings on the sensor (to differentiate between the two voltage and the two current ranges) and do not refer to or alter the ppm range chosen.

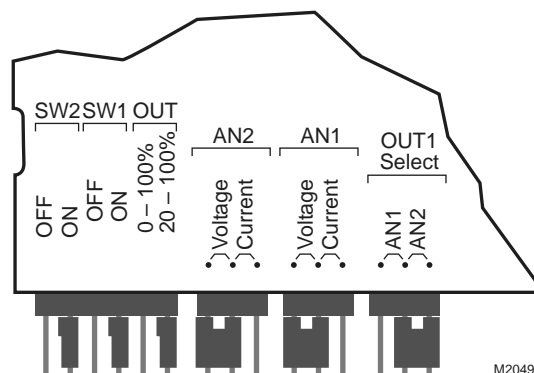


Fig. 8. C7232 default jumper settings for models with date code prior to 0309.

INSTRUCTIONS FOR (-)XRF-HEA1 MANUAL FRESH AIR DAMPER (-)XRX-AT01 MOTORIZED AND FRESH AIR DAMPER KIT

⚠ Recognize this symbol as an indication of Important Safety Information!

⚠ WARNING

THESE INSTRUCTIONS ARE INTENDED AS AN AID TO QUALIFIED, LICENSED SERVICE PERSONNEL FOR PROPER INSTALLATION, ADJUSTMENT AND OPERATION OF THIS UNIT. READ THESE INSTRUCTIONS THOROUGHLY BEFORE ATTEMPTING ADJUSTMENT OR OPERATION. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN IMPROPER INSTALLATION, ADJUSTMENT; SERVICE OR MAINTENANCE, POSSIBLY RESULTING IN FIRE, ELECTRICAL SHOCK, PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

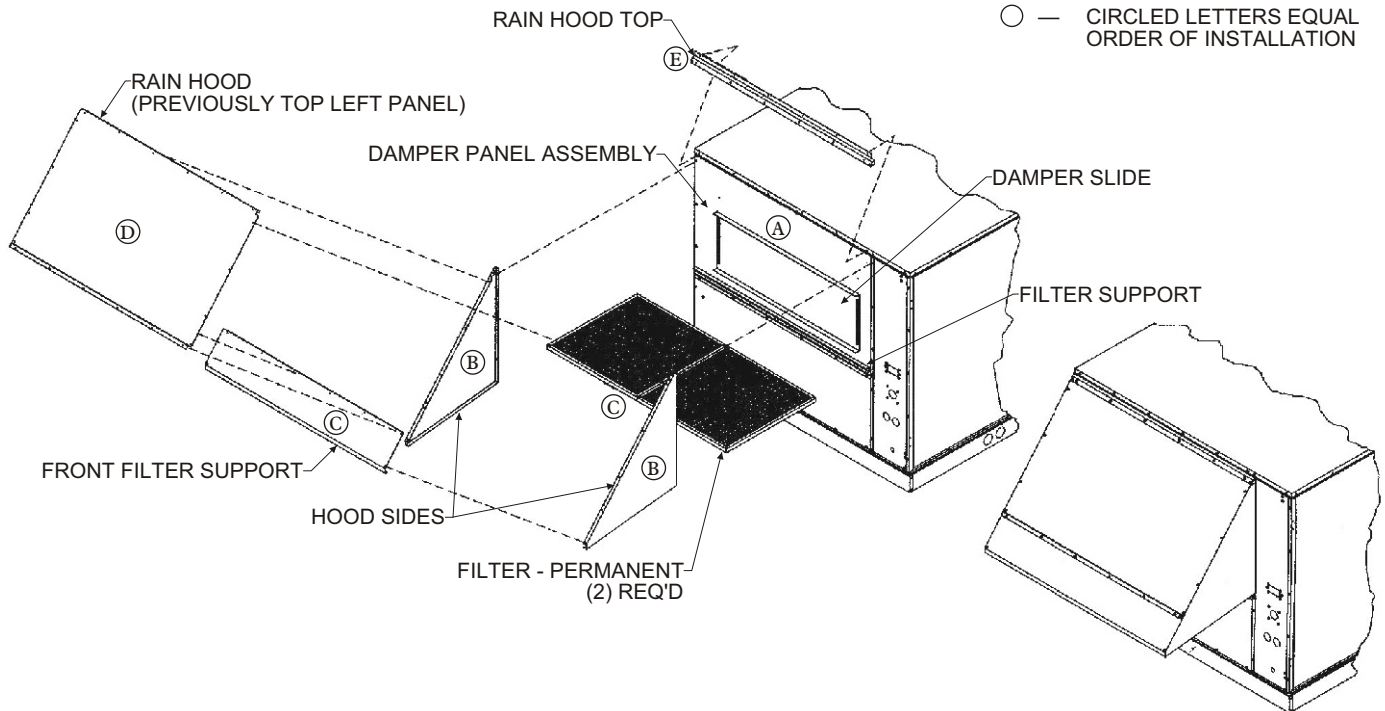
⚠ WARNING

TURN OFF ELECTRIC POWER TO THE UNIT BEFORE ATTEMPTING ANY MAINTENANCE. FAILURE TO DO SO CAN CAUSE ELECTRICAL SHOCK RESULTING IN PERSONAL INJURY OR DEATH.

1. Remove (4) screws from each side of the unit top cover.
2. Remove all screws from top left panel (retain screws and top left panel for later use).
3. Lift top cover high enough to replace top left panel with damper panel assembly.
4. Replace top left panel with (A) damper panel assembly.
5. Secure the (B) hood sides to the edges of the (A) damper panel assembly with (6) screws removed in step 2.
6. Adjust damper slide to appropriate opening now.
7. Trap (C) filters between (C) front filter support and filter support on the (A) damper assembly while attaching to the (B) hood side with (3) screws provided.
8. Attach (D) rain hood (previously the top left panel) to the (B) hood side with (4) screws each side, (6) screws between rain hood and front filter support.
9. Attach (E) rain hood top to the same location as upper edge of (A) damper panel assembly with (6) screws that were removed in step 2.
10. Secure (E) rain hood top to rain hood and hood side with (8) screws provided.
11. Secure all remaining screws, making sure that all weather exposed screw holes use the screws.

NOTE:

○ — CIRCLED LETTERS EQUAL ORDER OF INSTALLATION

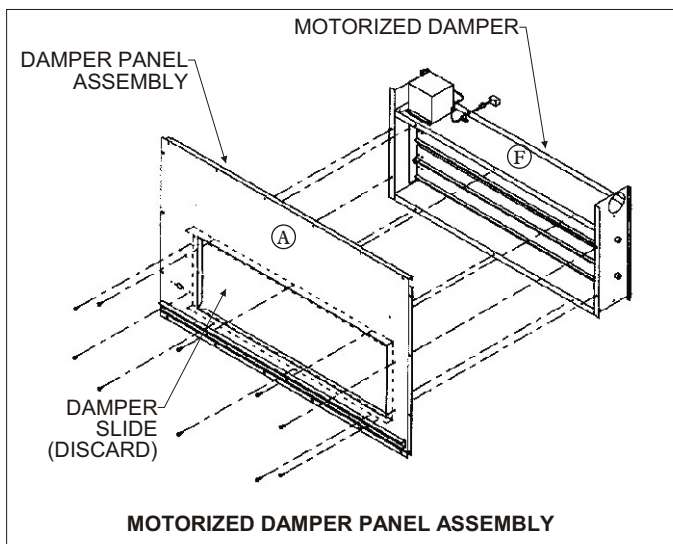


IF UNIT HAS AN EXISTING MANUAL FRESH AIR DAMPER

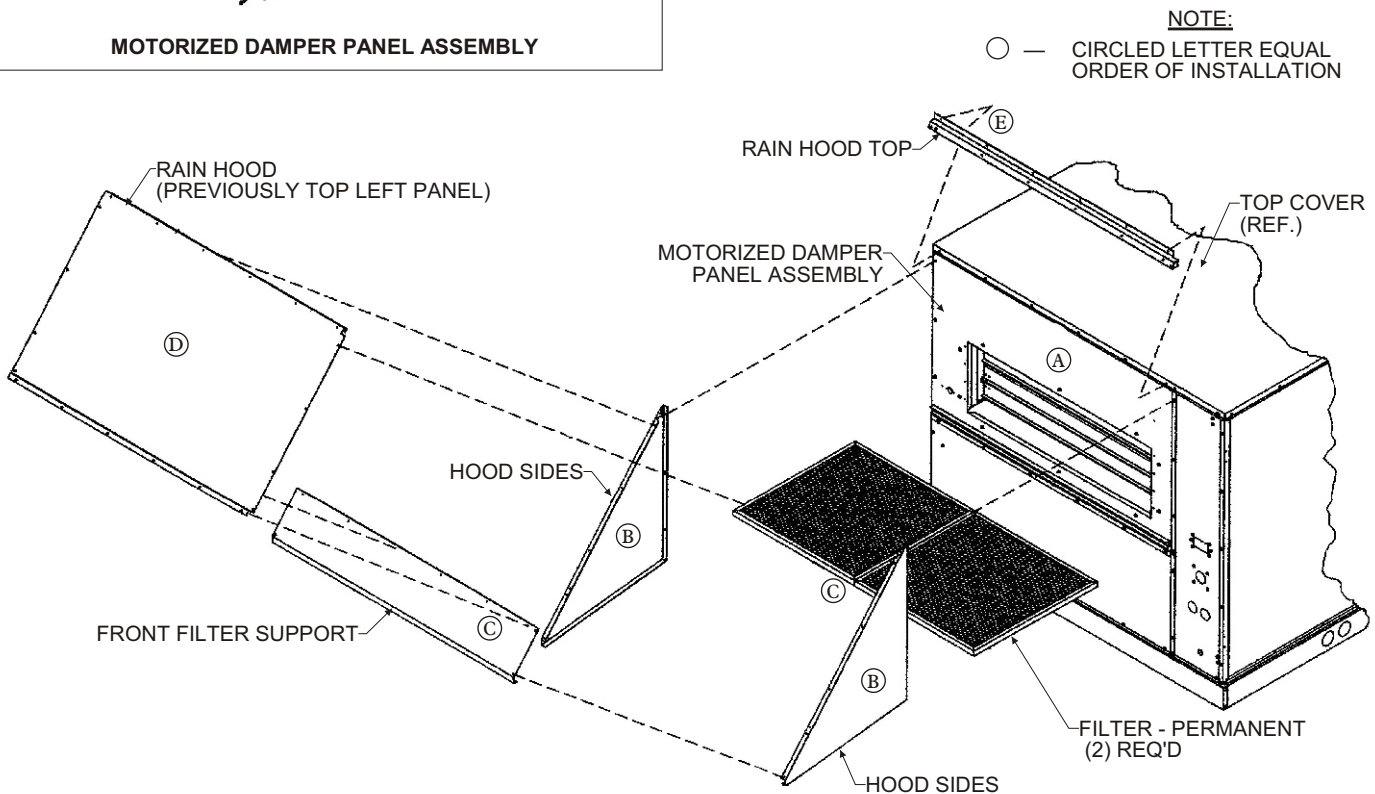
Refer to page 1. Reverse assembly procedure until damper panel assembly is removed. Assemble motorized damper assembly (see (F) below). Then reassemble fresh air damper using motorized damper assembly.

IF UNIT HAS NO EXISTING MANUAL FRESH AIR DAMPER

1. Assemble motorized damper panel assembly by removing the damper slide from damper panel assembly, then attaching the (F) motorized damper to the opposite side. Use (6) of the screws from the damper slide to attach the motorized damper.
2. Remove (4) screws from top cover sides.
3. Remove all screws from top left panel (retain screws and top left panel for later use).

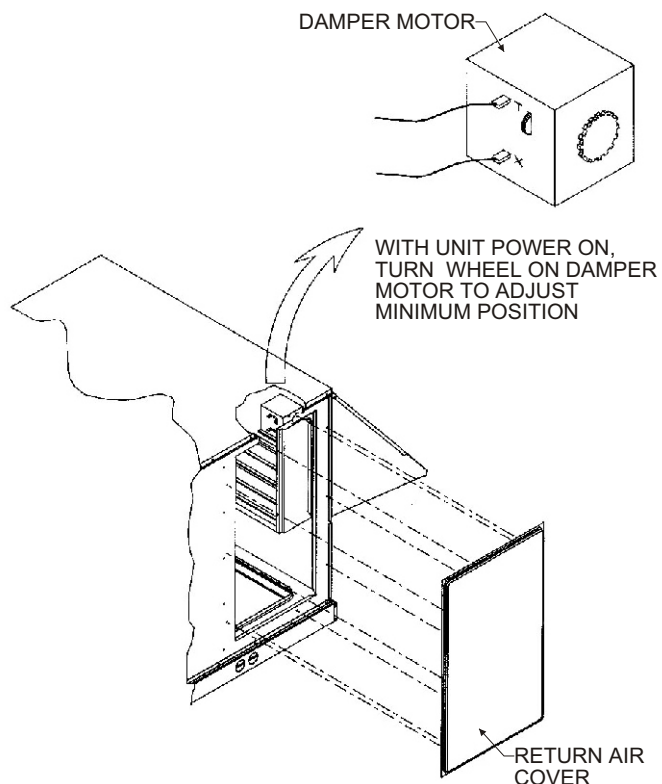


4. Lift top cover and remove top left panel. Plug power cord for motorized damper into polarized wire harness connector.
5. Apply power to unit and set minimum damper position with adjustment wheel on damper motor.
6. Secure the (B) hood sides to the edges of the (A) motorized damper panel assembly with (6) screws removed in step 3.
7. Trap (C) filters between (C) front filter support and filter support on the (A) damper assembly while attaching to the (B) hood side with (3) screws provided.
8. Attach (D) rain hood (previously the top left panel) to the (B) hood side with (4) screws each side, (6) screws between rain hood and front filter support.
9. Attach (E) rain hood top to the same location as upper edge of (A) damper panel assembly with (6) screws that were removed in step 3.
10. Secure (E) rain hood top to rain hood and hood side with (8) screws provided.
11. Secure all remaining screws, making sure that all weather exposed screw holes use the screws.



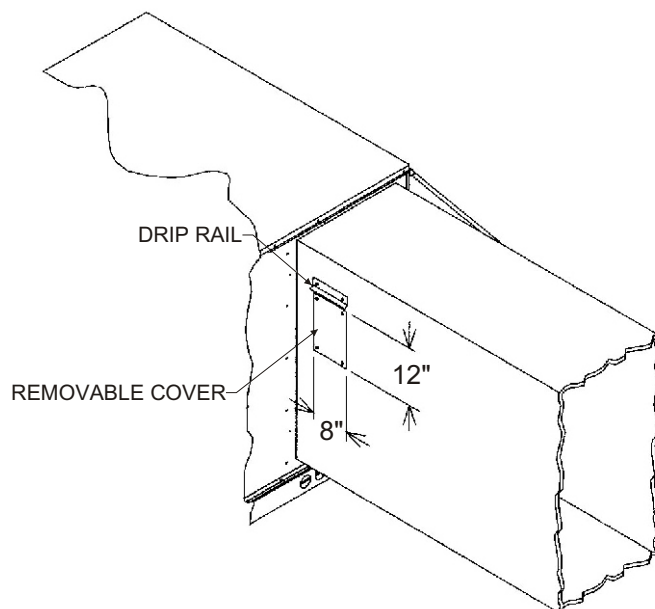
TO ADJUST DAMPER MINIMUM POSITION

1. Remove return air cover.
2. Apply power to unit.
3. Supply fan **must** be on.
4. Turn potentiometer wheel on damper motor to adjust damper minimum position,
5. After successfully adjusting damper position, replace return air cover.

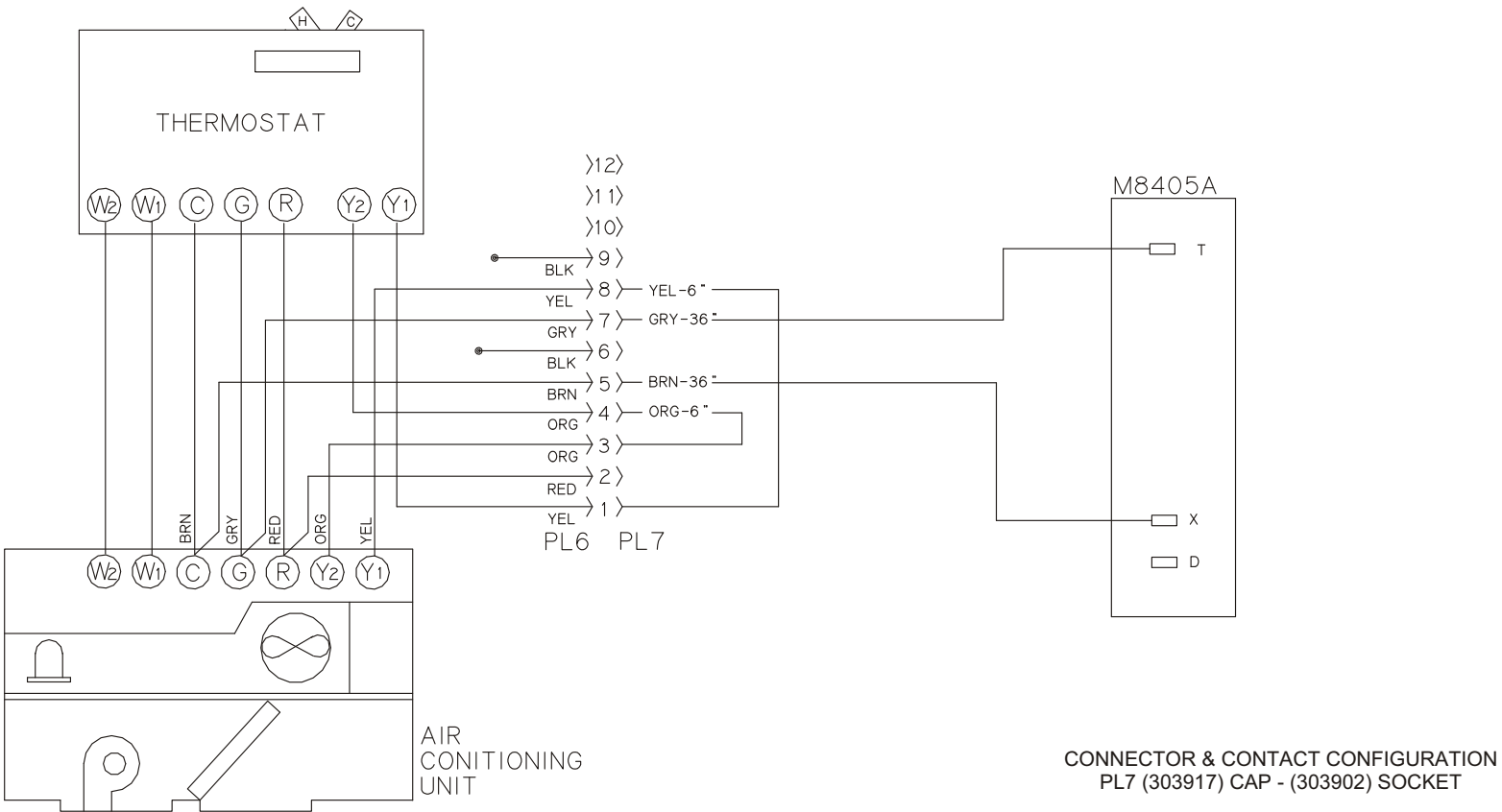


FOR HORIZONTAL AIR FLOW INSTALLATIONS

1. Installer must provide opening in return air duct with removable cover for access to minimum position adjustment on motorized damper.
2. Remove cover on return air duct.
3. Apply power to unit.
4. Supply fan **must** be on.
5. Turn potentiometer wheel on damper motor to adjust damper minimum position.
6. After successfully adjusting damper position, replace cover on return air duct.



HARNESS DETAIL		COMPONENT CODE		WIRE COLOR CODE			
E# = WIRE END DESIGNATION		Economizer		BLK	Black	BLU	Blue
E2	STUD #6 18 Ga. Wire	M8405A	Damper Actuator 24v	BRN	Brown	GRY	Gray
E3	Female ¼ Quick Disc.	PL7	Female Damper Plug	ORG	Orange	RED	Red
E4	Male ¼ Quick Disc. Insul	PL6	Male A/C Unit Plug	WHT	White	YEL	Yellow
E6	Wire Nut Size 73B						
HARNESS ENDS AT PL7							



Notes:
1. Unit wiring shown as reference only. Check unit wiring for actual unit wiring.

**0-35% Motorized Outside Air
RXRX-AT01**

Rooftop Systems, Inc. 2405 McIver Lane Carrollton, Texas 75006 Phone (972) 247-7447 Fax (972) 243-0940	Date: August 29, 2000
	Supercedes: 02-23-00
	Drawn by:
	Unit # 60-287-15B
Diagram# 28715W	

INSTALLATION INSTRUCTIONS

MODEL RXRF - FBB1

0-35% MOTORIZED OUTSIDE AIR

The 0-35% manual outside air system is designed to replace the unit duct cover. No drilling on the unit or field assembly is required. A 2-position control motor opens the intake damper when the blower is energized. The amount of air is controlled by the a slide damper on damper motor. The intake panel is fully insulated..

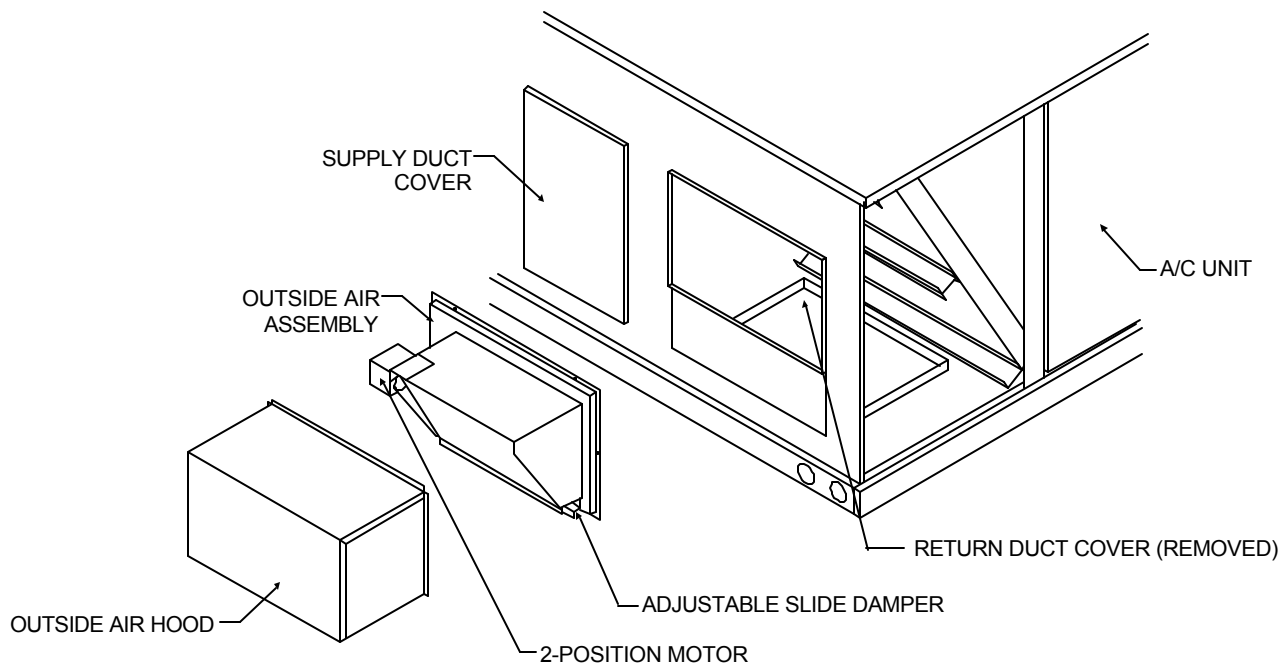


FIGURE 1

STEP 1:

Check for correct number of parts. See list below:

- 1 ea. - Outside Air Intake damper assembly with hood and slide damper.

STEP 2:

Remove return air duct cover from unit, and save the screws.

STEP 3:

Remove filter access panel. Plug the "PL5" connector to "PL2" connector in return section.

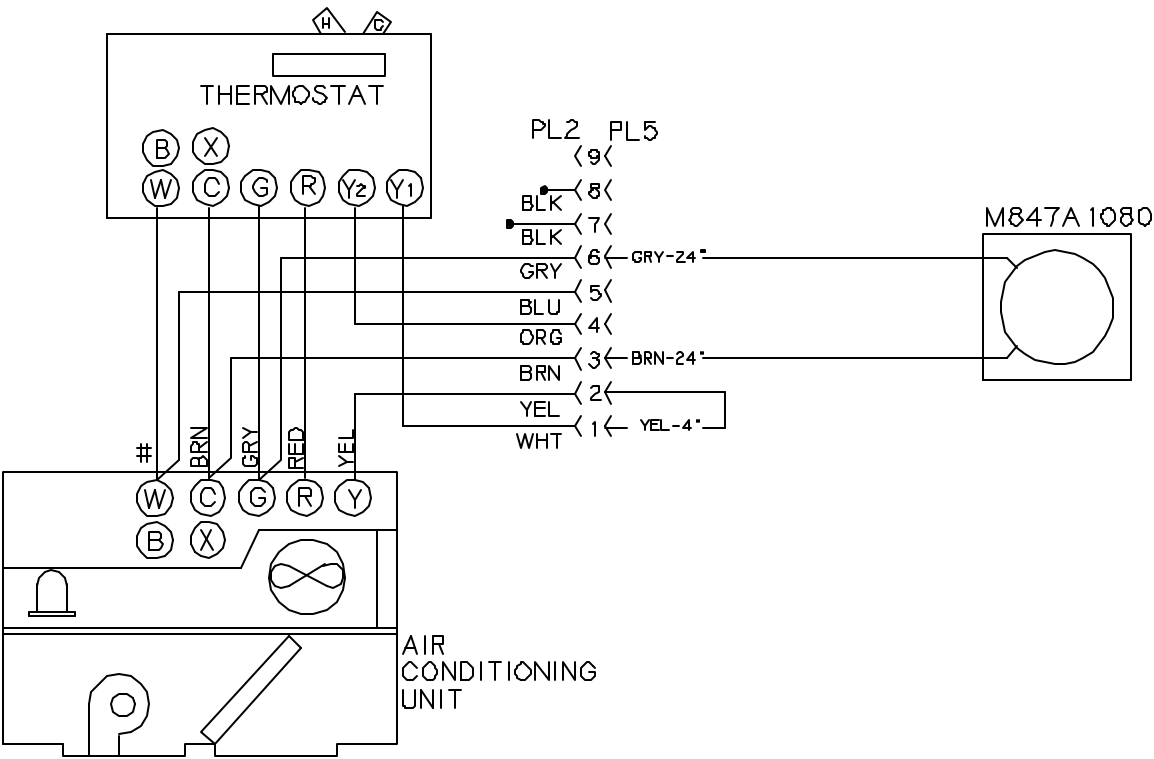
STEP 4:

Install outside air assembly as shown in Figure 1 over duct opening with the screws removed in Step 2.

STEP 5:

Adjust the slide damper to the desired position.

HARNESSDETAIL	COMPONENTCODE	WIRE COLOR CODE
E# = WIRE END DESIGNATION E2 STUD #6 18 Ga. Wire E3 Female ¼ Quick Disc. E4 Male ¼ Quick Disc. In sul E6 Wire Nut Size 73B <p style="text-align: center;">HARNESS STOPS AT PL5</p>	Economizer M847A1080 Damper Actuator 24v PL5 Male Damper Plug PL2 Female A/C Unit Plug	RED Red BLU Blue GRY Gray BRN Brown



Notes:

- Unit wiring shown as reference only.

0-35% MOTORIZED DAMPER RKKA/RJKA/RLKA 036-072	
Rheem Manufacturing 5600 Old Greenwood Rd Ft. Smith, AR 72917-7010 Form# 35MAD20BW	Date: February 27, 1998
	Drawn by:
	Unit # RXRF- FBB1
	Diagram# 6028220BW

Disconnect Switch for Maverick I™ Units

Group: **MPS**Part Number: **IM 904**Date: **January 2008**

MPS 007 to 020 ton

Installation



WARNING

Failure to follow these instructions can result in improper installation, adjustment, service, or maintenance, and can result in fire, electrical shock, property damage, personal injury, or death. These instructions are intended as an aid to qualified service personnel for proper installation, adjustment, and operation of this kit. Read carefully and thoroughly before attempting installation, adjustment, or operation.

Parts List

Description	Part Number	Quantity
Disconnect switch assembly	42-42559-02	1
Wire (black)	AE-72749-17	3
Label (On/Off)	92-42563-01	1

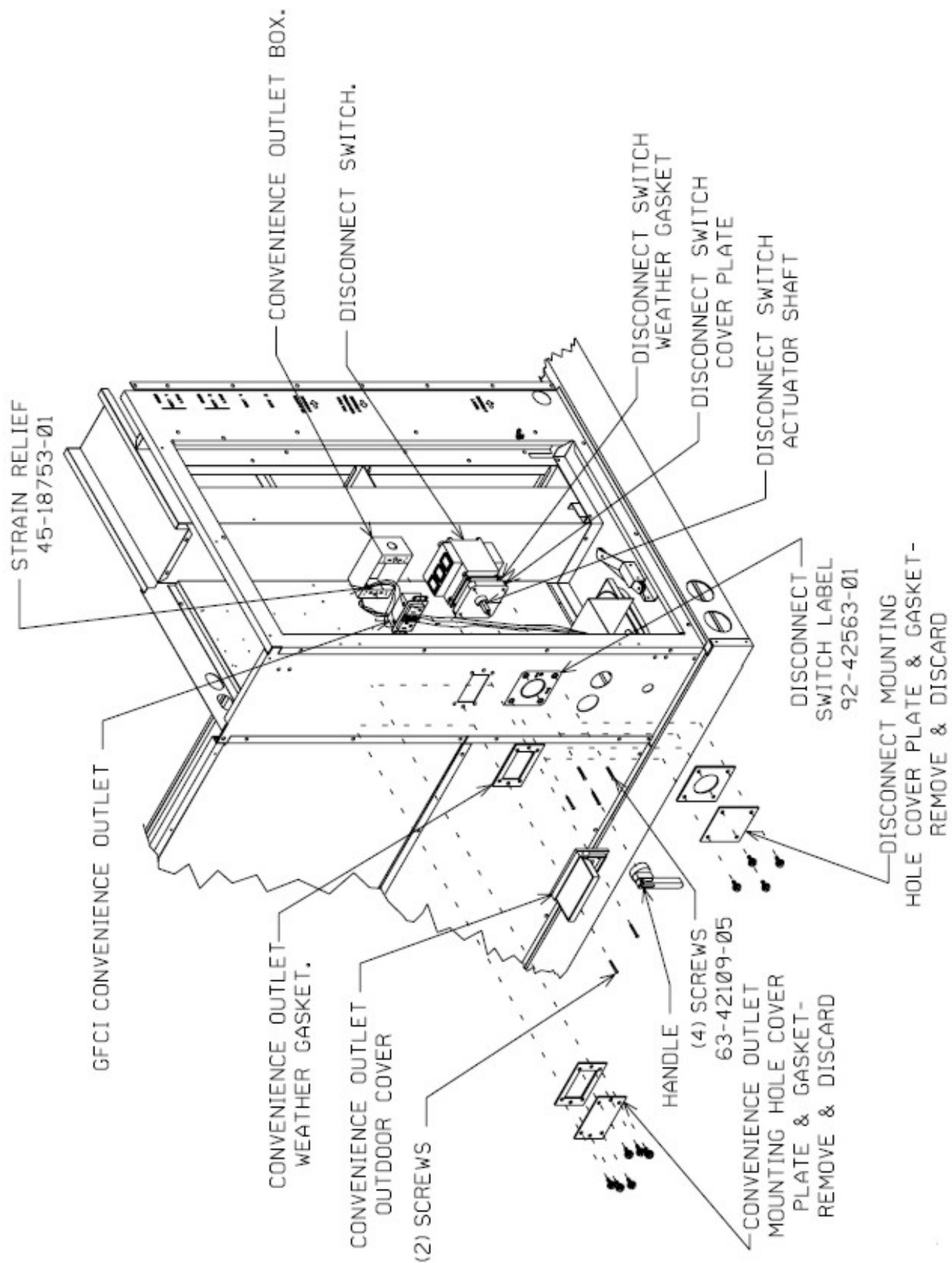


DANGER

Electrical shock hazard. Can cause property damage, personal injury or death. Before beginning any modification, be sure the main disconnect switch is in the "Off" position and tagged with a suitable warning label.

Procedure (also see diagram next page)

1. Connect the three black wires to terminals T1, T2, and T3 located on the disconnect switch.
2. Remove the disconnect switch mounting hole cover plate (with gasket) and discard.
3. Place the actuator shaft through the weather gasket.
4. Insert the actuator shaft and weather gasket assembly onto the disconnect switch.
5. Place the cover plate over the actuator shaft and on top of the weather gasket.
6. Position the assembly adjacent to the panel with the actuator shaft through the large hole.
7. Through the panel, insert and tighten four screws (63-42109-05) into the disconnect switch.
8. Place the label over the four screws.
9. Position the handle on the actuator shaft.
10. Tighten the set screw.
11. Connect the three black wires to L1, L2, and L3 located on terminal block TB1.



INSTRUCTIONS FOR DUAL ENTHALPY SENSOR UPGRADE KIT

Installation

Upgrade single enthalpy economizers (outdoor air enthalpy) to dual enthalpy by adding a return air enthalpy sensor and wiring it to the Honeywell model W7213A1016 Logic Module.

Parts Included

The sensor upgrade kit contains the following:

- (1) Sensor
- (1) Wiring harness
- (2) No. 8-16 x $\frac{3}{4}$ " PHI/PAN - TEC screws
- (1) Strain relief bushing
- **(Required for 7.5 to 25 ton units only)**
- (1) Sensor mounting bracket
- **(Required for the 3 to 6 and 7.5 Ton units only)**
- (2) No. 10 self-drilling screws ($\frac{1}{2}$ - inch long)
- (3) Tie wraps

⚠ WARNING: Risk of Electrical Shock.

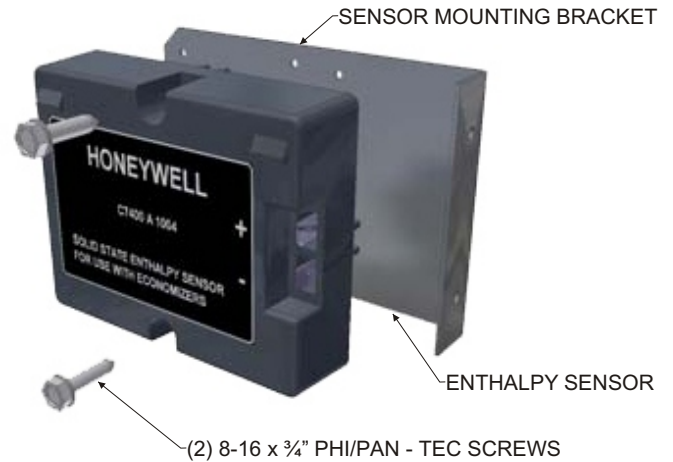
Disconnect the power supply and install a lockout tag before wiring connections are made to avoid possible electrical shock or damage to the equipment.

Mounting

3 to 6 and 7.5 Ton Vertical

To mount the sensor:

1. Remove four screws holding barometric damper.
2. Mount the bracket to the Economizer damper using the two No. 10 self-drilling screws provided.



**Figure 1: Mounting the Sensor to the Bracket
Mounting for 3 to 6 and 7.5 Ton Economizer**

3. Mount the sensor to the mounting bracket (refer to Figure 1 for the proper bracket orientation) using the two No. 6-20 thread-forming screws (provided).

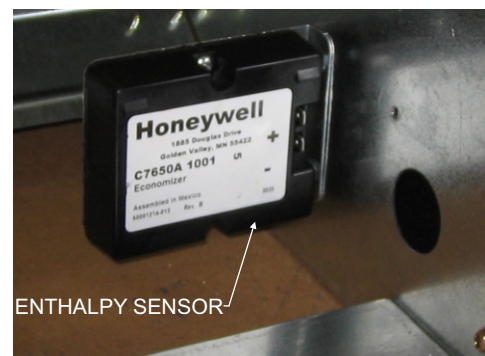
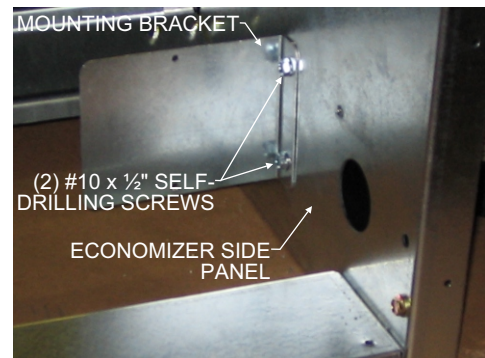
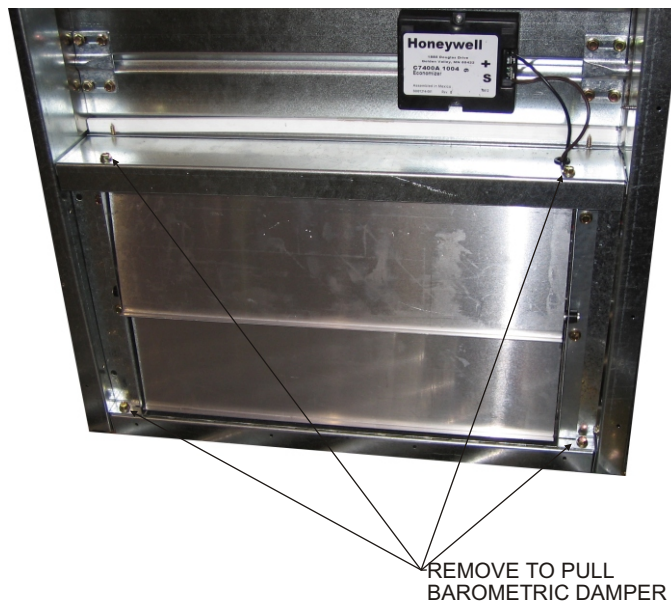


Figure 2: Mounting the Sensor and Bracket in a 3 to 6 and 7.5 Ton Economizer Assembly

7.5 to 25 Ton Vertical and Horizontal

To mount the sensor:

1. Remove the four screws holding the return air sensor mounting plate to the damper (see Figure 3).
2. Mount the sensor to the mounting plate using the two No. 6-20 thread-forming screws (provided).

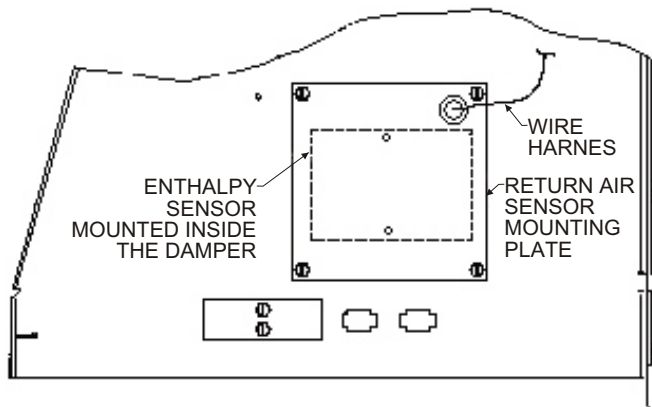
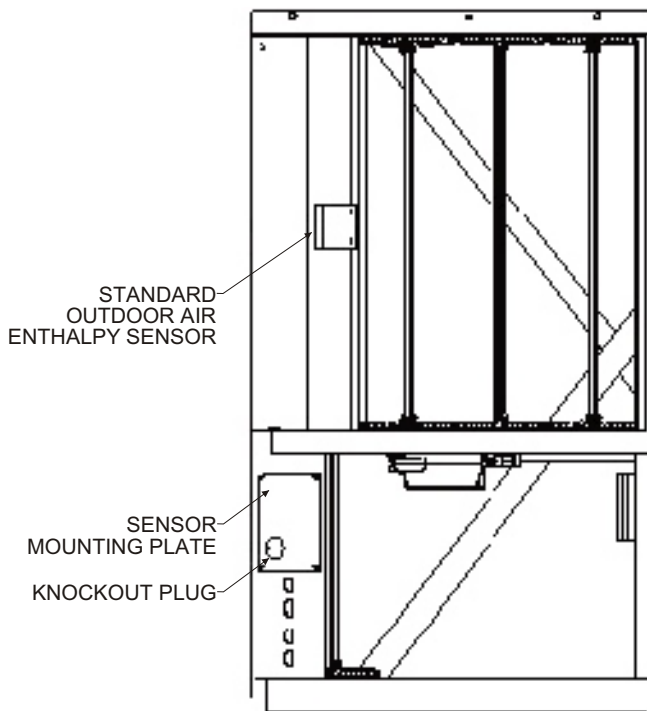


Figure 3: 7.5 to 12.5 and 15 to 25 Ton Vertical Economizer with Enthalpy Sensor Installed



Note: The sensor mounting plate gets installed so that the sensor resides in the return RA air stream.

Figure 4: 7.5 to 12.5 and 15 to 25 Ton Horizontal Economizer Showing the Sensor Mounting Position

Wiring

3 to 6 and 7.5 Ton Vertical

To wire the sensor to the Logic Module:

1. Remove the strain relief from the damper.
2. Feed the wiring Enthalpy harness wires through the opening with the existing control harness and replace the strain relief furnished with the damper originally.
3. Route and attach the wiring harness with the other harnesses on the damper using the tie wraps provided.
4. Wire the sensor and Logic Module (see Figure 5 for wiring).
5. Ensure the barometric relief dampers move freely.
6. Reconnect the electrical power supply.

7 to 25 Ton Vertical and Horizontal

To wire the sensor to the Logic Module:

1. Remove the knockout plug from the mounting plate (see Figure 4).
2. Feed the wiring harness wires through the knockout opening and insert the strain relief provided to secure the wires.
3. Route and attach the wiring harness with the other harnesses on the damper using the tie wraps provided.
4. Wire the sensor and Logic Module (see Figure 5 for wiring).
5. Mount the sensor to the mounting plate using (2) 6-20 x $\frac{7}{8}$ " screws. Secure mounting plate back to the damper using the four screws removed in Step 1 of the 7 to 25 Ton Vertical and Horizontal section.
6. Reconnect the electrical power supply.

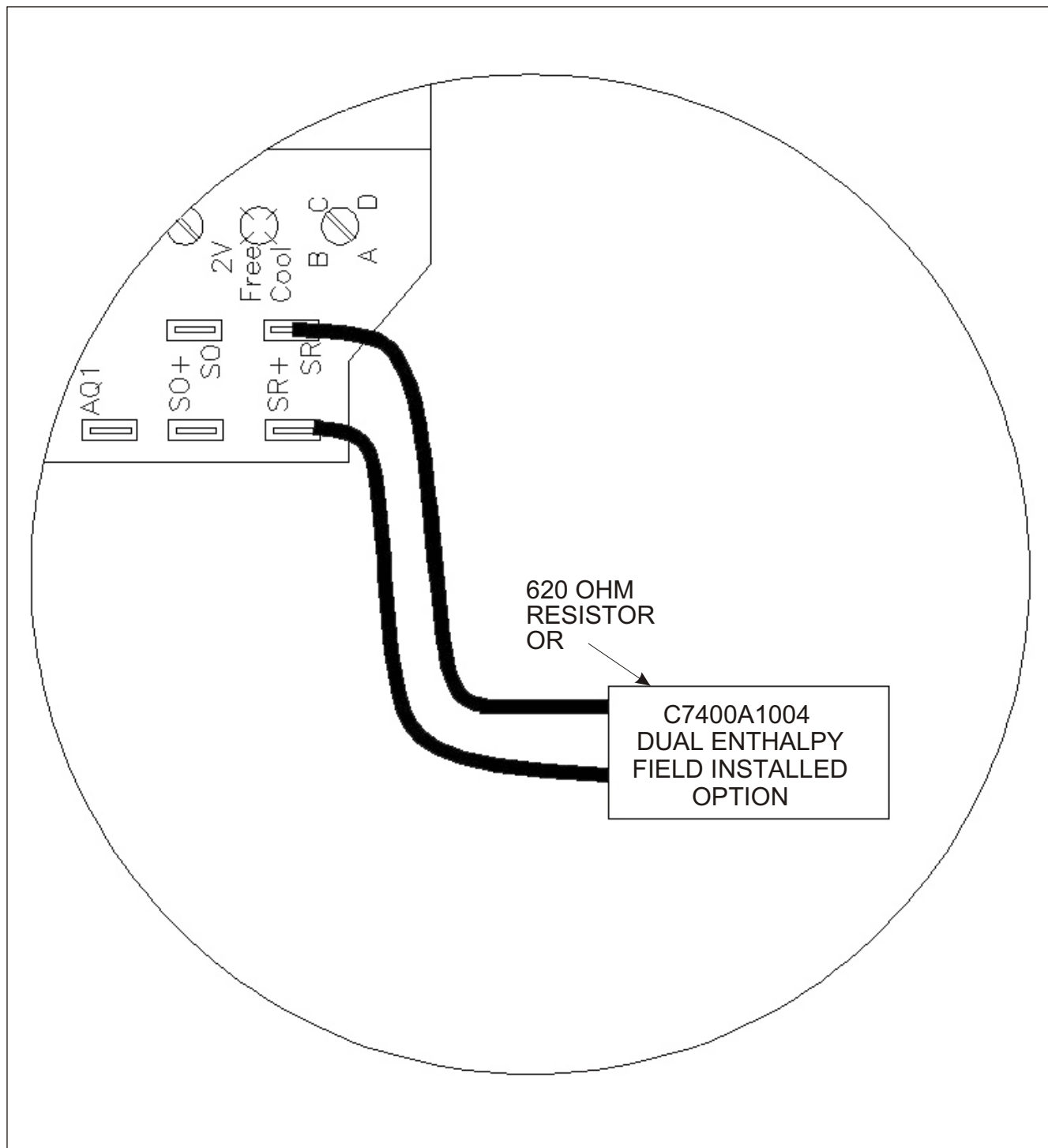


Figure 5: Enthalpy Sensor Wiring Diagram

INSTALLATION INSTRUCTIONS

MODELS RXRD-MCCM3 & RXRD-MECM3

CONVERTIBLE AIRFLOW ECONOMIZERS

⚠ WARNING

THIS ACCESSORY IS TO BE INSTALLED BY A QUALIFIED, LICENSED SERVICE PERSON. TO AVOID UNSATISFACTORY OPERATION OR DAMAGE TO THE PRODUCT AND POSSIBLE UNSAFE CONDITIONS, INCLUDING ELECTRICAL SHOCK, REFRIGERANT LEAKAGE AND FIRE, THE INSTALLATION INSTRUCTIONS PROVIDED WITH THIS ACCESSORY MUST BE STRICTLY FOLLOWED AND THE PARTS SUPPLIED USED WITHOUT SUBSTITUTION. DAMAGE TO THE PRODUCT RESULTING FROM NOT FOLLOWING THE INSTRUCTIONS OR USING UNAUTHORIZED PARTS MAY BE EXCLUDED FROM THE MANUFACTURER'S WARRANTY COVERAGE.

⚠ WARNING

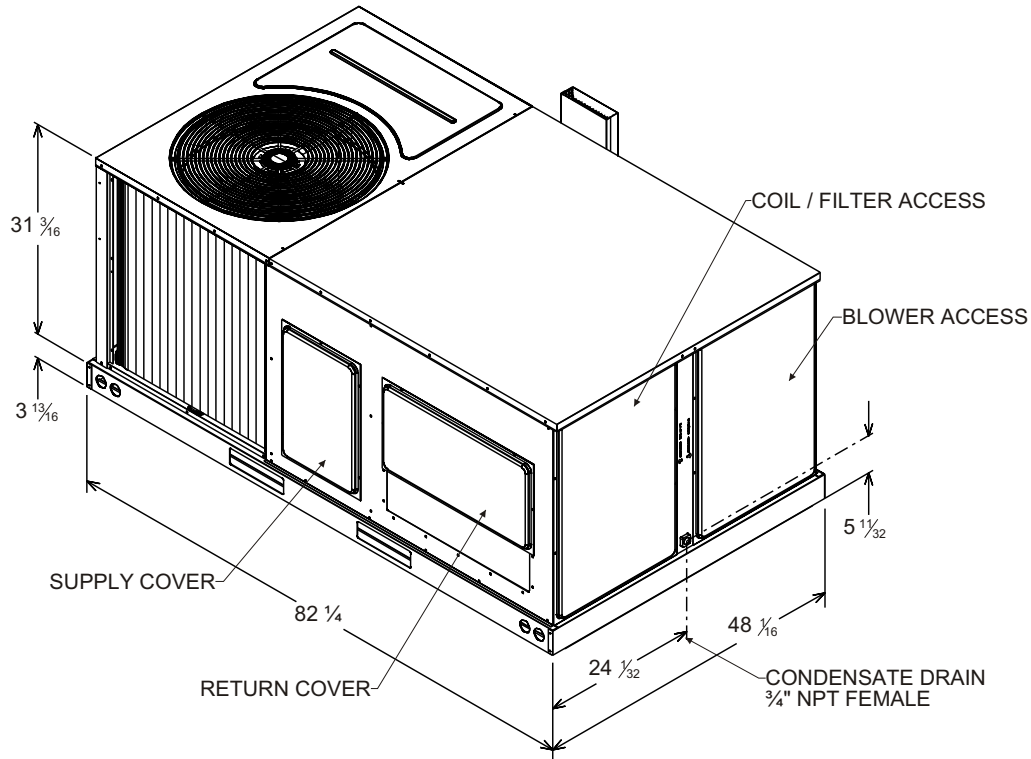
DISCONNECT ELECTRICAL POWER TO THE UNIT. FAILURE TO DO SO CAN CAUSE ELECTRICAL SHOCK RESULTING IN PERSONAL INJURY OR DEATH.

TOOLS REQUIRED FOR INSTALLATION:

$\frac{3}{8}$ " electric drill with $\frac{5}{16}$ " socket	Small flat blade (0.125" wide) screwdriver
$\frac{1}{8}$ " diameter drill bit for sheet metal.	Sheet metal tools (e.g. shears)

PACKAGE CONTENTS		RXRD-MECM3 economizer with controller, actuator, and outside enthalpy sensor attached	RXRD-MCCM3 economizer with controller, actuator, and outside enthalpy sensor attached
ITEM	DESCRIPTION	PART No.	PART No.
1	Discharge Air Sensor (Hardware Bag)	6036420 / 3112	6036408 / 3112
2	Permanent Filter	6036420 / 8569 15 ½ x 21 ¾	6036408 / 8570 15 ½ x 27 ¾
3	Bird Screen	6036420 / PERF	6036408 / PERF
4	OA Rainhood – Filter Access	6036420 / FAP	6036408 / FAP
5	OA Rainhood Assy – Left Side	6036420 / EHSL	6036408 / EHSL
6	OA Rainhood Assy – Right Side	6036420 / EHSR	6036408 / EHSR
7	OA Rainhood Assy – Bottom	6036420 / EHB	6036408 / EHB
8	OA Rainhood – Top	6036420 / EHT	6036408 / EHT
9	OA Rainhood – Filter Retainer	6036420 / FCH	6036408 / FCH
10	BR Rainhood Assy – Left Side	6036420 / EHS2L	6036408 / EHS2L
11	BR Rainhood Assy – Right Side	6036420 / EHS2R	6036408 / EHS2R
12	BR Rainhood Assy – Bottom	6036420 / EHB2	6036408 / EHB2
13	BR Rainhood – Top	6036420 / EHT2	6036408 / EHT2
14	BR Rainhood – Bird Screen	6036420 / FCH2	6036408 / FCH2
15	Hardware Bag	6036420 / HDW	6036408 / HDW

FIGURE 1
RXRD-MECM3 Shown
RRDX-MCCM3 Similar



A0801-12

STEP 1:

Immediately upon receipt, all cartons and contents should be inspected for transit damage. Units with damaged cartons should be opened immediately. If damage is found, it should be noted on the delivery papers and a damage claim filed with the last carrier. Compare carton(s) contents to PACKAGE CONTENTS List (**TABLE 1**) above to note any missing items.

STEP 2:

Remove RETURN COVER, COIL/FILTER ACCESS PANEL and BLOWER ACCESS PANEL from the unit and retain for reuse (**SEE FIGURE 1**). Retain screws.

STEP 3:

Remove the RETURN AIR FILLER and carefully cut insulation attached to fully expose return air opening. Discard the RETURN AIR FILLER.

STEP 4:

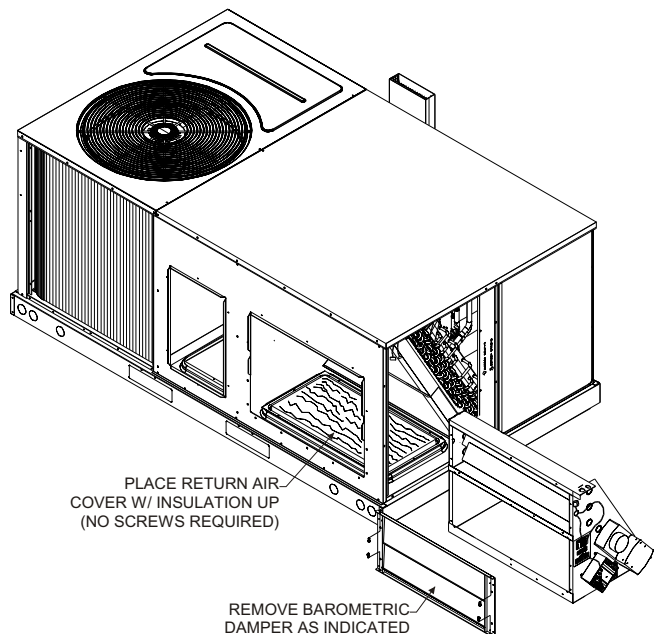
For sideflow applications, install the RETURN COVER in the bottom return opening. Discard the RETURN COVER for downflow applications.

STEP 5:

For sideflow applications, remove the barometric relief damper from economizer prior to installation in unit. This component will be relocated to the sideflow return air duct along with the barometric relief hood (**SEE FIGURE 2**).

FIGURE 2

SIDEFLOW APPLICATIONS ONLY



A0818-04-01

NOTE:

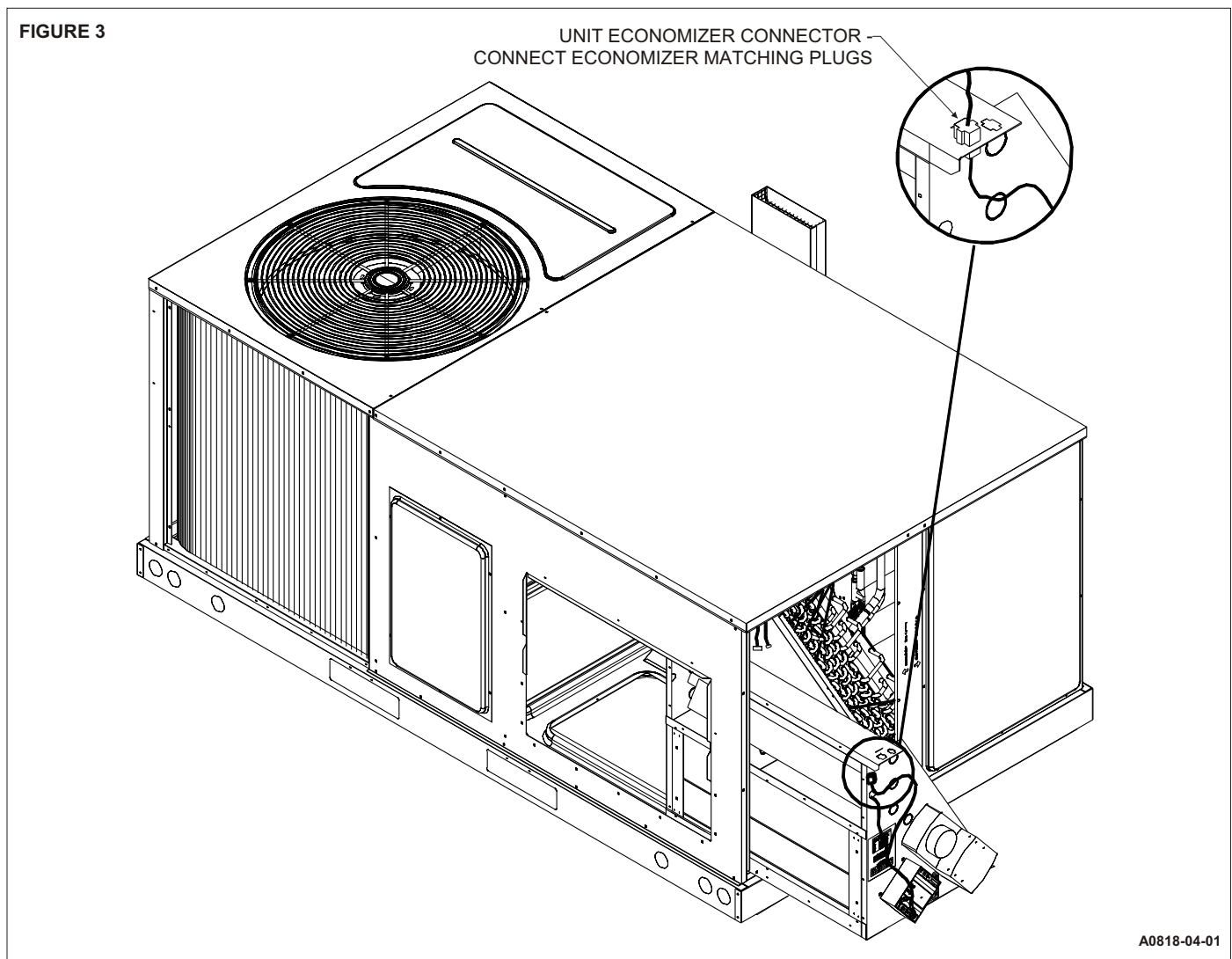
Units produced after August 20, 1999, have economizer connections relocated. For units produced before this date, go to **STEP 6**. For units produced after this date, go to **STEP 7**.

STEP 6:

These units will require an EXTENSION HARNESS (not provided) to connect the economizer to the ECONOMIZER PLUG provided on the unit. Remove jumper plugs, connect EXTENSION HARNESS to unit ECONOMIZER PLUG, and slide economizer into unit return air section being careful not to tear the insulation on the rear panel (**SEE FIGURE 3**). After the economizer is installed, snap the EXTENSION HARNESS plugs into the openings in the economizer top and connect mating economizer plug. Save the jumper plugs in this compartment for diagnostic purposes.

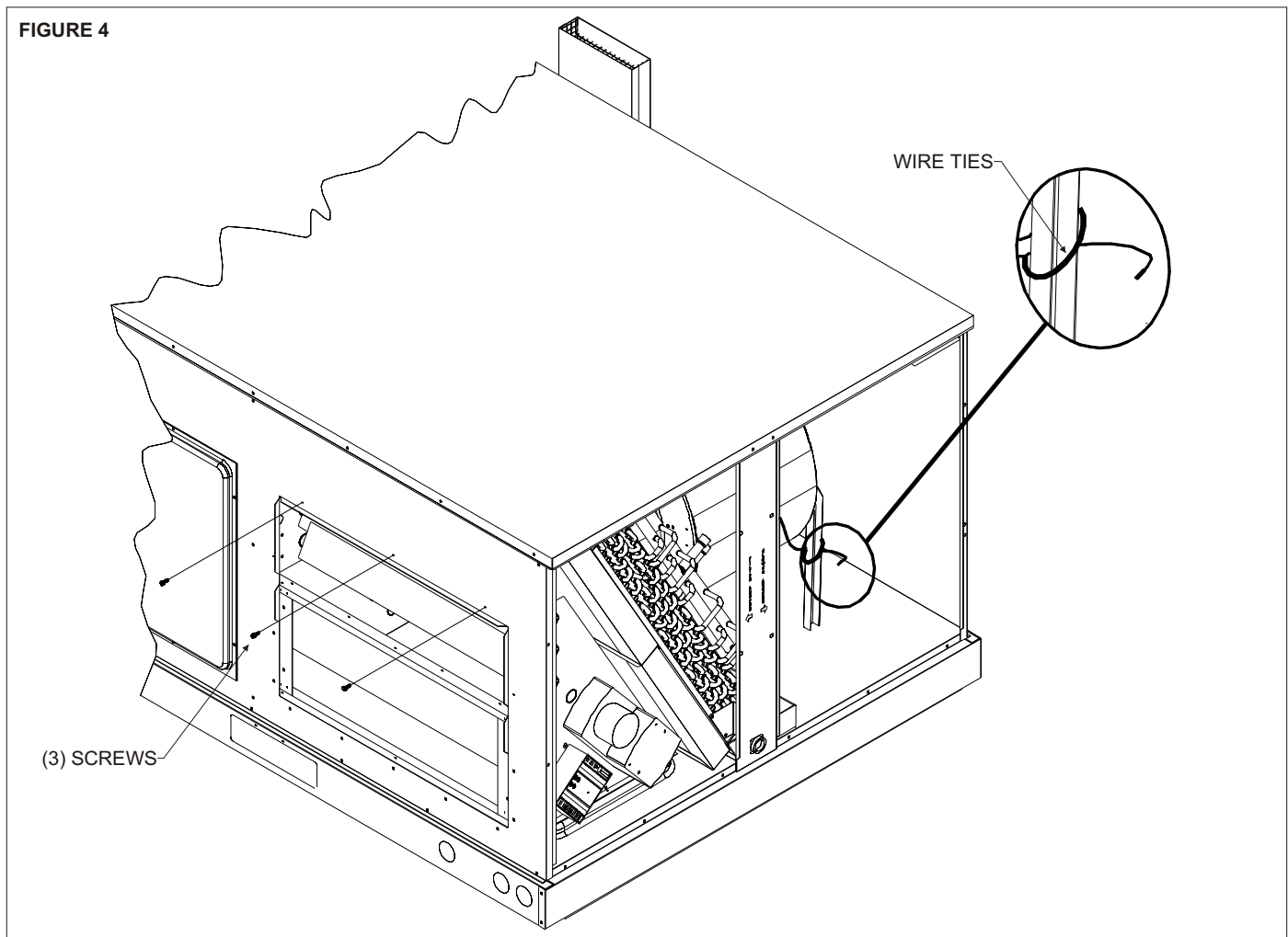
STEP 7:

Remove jumper plugs and slide economizer into unit return air section being careful not to tear the insulation on the rear panel (**SEE FIGURE 3**). After the economizer is installed, snap the unit ECONOMIZER PLUGS into the openings in the economizer top and connect mating economizer plug. Save the jumper plugs in this compartment for diagnostic purposes.



STEP 8:

Using the holes located above the return air opening on the unit attach the economizer to the REAR PANEL using the screws removed in **STEP 2 (SEE FIGURE 4)**.

FIGURE 4**ECONOMIZER RAIN HOOD (FRESH AIR) ASSEMBLY****STEP 9:**

Fasten (7) OA RAINHOOD ASSY – BOTTOM to the (5) OA RAINHOOD ASSY – LEFT SIDE and the (6) OA RAINHOOD ASSY - RIGHT SIDE.

STEP 10:

Attach the two (9) OA RAINHOOD – FILTER RETAINERS to the (5) OA RAINHOOD ASSY – LEFT SIDE and the (6) OA RAINHOOD ASSY – RIGHT SIDE from **STEP 9** above. Please notice that the flange on the (9) OA RAINHOOD – FILTER RETAINERS must be as shown in (**SEE FIGURE 5**) to retain the (2) PERMANENT FILTER.

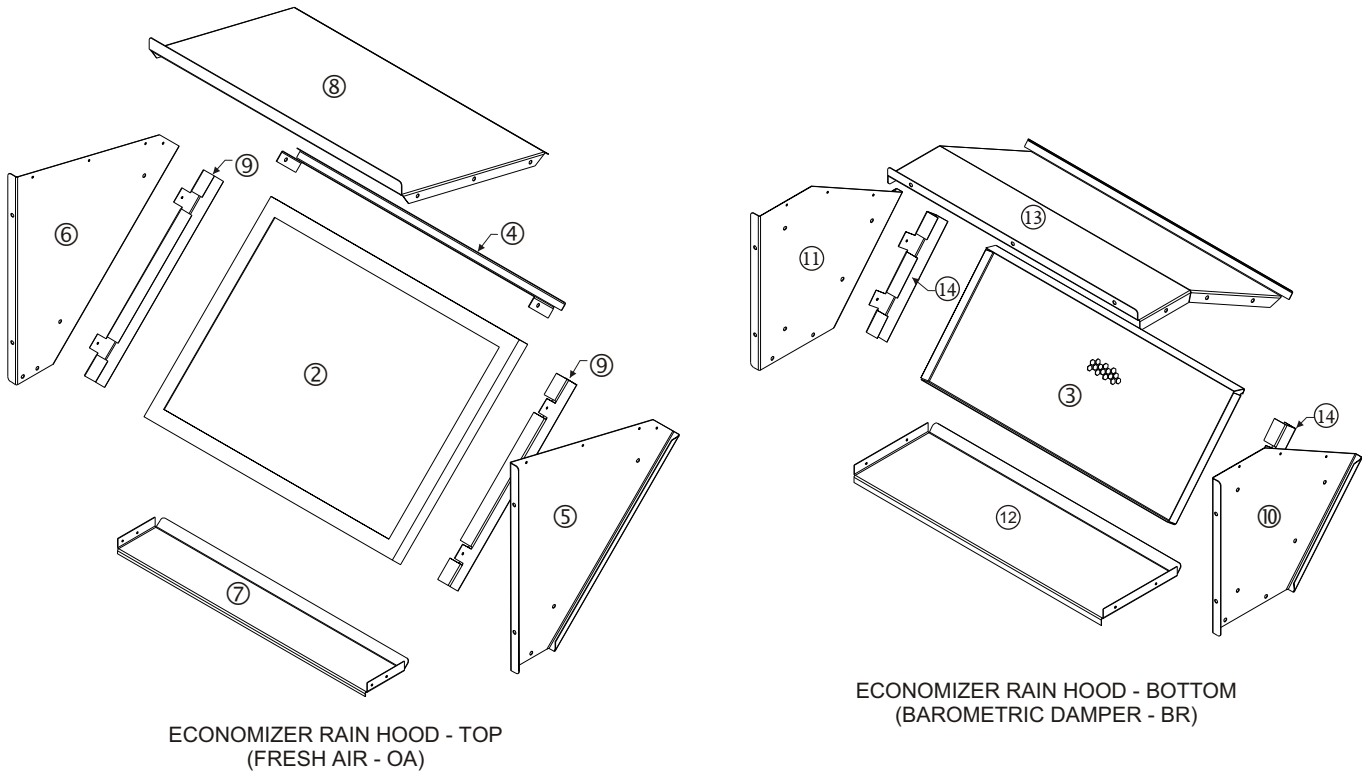
STEP 11:

Fasten (8) OA RAINHOOD – TOP to the (5) OA RAINHOOD ASSY – LEFT SIDE and the (6) OA RAINHOOD ASSY – RIGHT SIDE.

STEP 12:

Slide (2) PERMANENT FILTER between (9) OA RAINHOOD – FILTER RETAINERS and back into the (7) OA RAINHOOD ASSY – BOTTOM. Attach (4) OA RAINHOOD – FILTER ACCESS to the front/top of (5) OA RAINHOOD ASSY – LEFT SIDE and the (6) OA RAINHOOD ASSY – RIGHT SIDE.

FIGURE 5
RXRD-MECM3 Shown
RRDX-MCCM3 Similar



ECONOMIZER RAIN HOOD (BAROMETRIC DAMPER) ASSEMBLY

STEP 13:

Fasten (12) BR RAINHOOD ASSY – BOTTOM to the remaining (10) BR RAINHOOD ASSY – LEFT SIDE and the remaining (11) BR RAINHOOD ASSY – RIGHT SIDE.

STEP 14:

Attach the two (14) BR RAINHOOD – FILTER RETAINERS to the (10) BR RAINHOOD ASSY - LEFT SIDE and the (11) BR RAINHOOD ASSY – RIGHT SIDE from **STEP 13** above. Please notice that the flange on the (14) BR RAINHOOD – FILTER RETAINERS must be as shown in (**SEE FIGURE 5**) to retain the (3) BIRD SCREEN.

STEP 15:

Slide (3) BIRD SCREEN between (14) BR RAINHOOD – FILTER RETAINERS and back into the (12) BR RAINHOOD ASSY – BOTTOM.

STEP 16:

Fasten (13) BR RAINHOOD – TOP to the (10) BR RAINHOOD ASSY - LEFT SIDE and the (11) BR RAINHOOD ASSY – RIGHT SIDE.

STEP 17:

Fasten HOOD EXTENSION SIDES to the outside of HOOD EXTENSION BOTTOM and HOOD EXTENSION DIVIDER with screws provided with economizer. Fasten HOOD EXTENSION TOP to the OUTSIDE OF HOOD EXTENSION SIDES. (**SEE FIGURE 6.**)

STEP 18:

Install HOOD EXTENSION ASSEMBLY and economizer with remaining screws removed in **STEP 2.** (**SEE FIGURE 6.**)

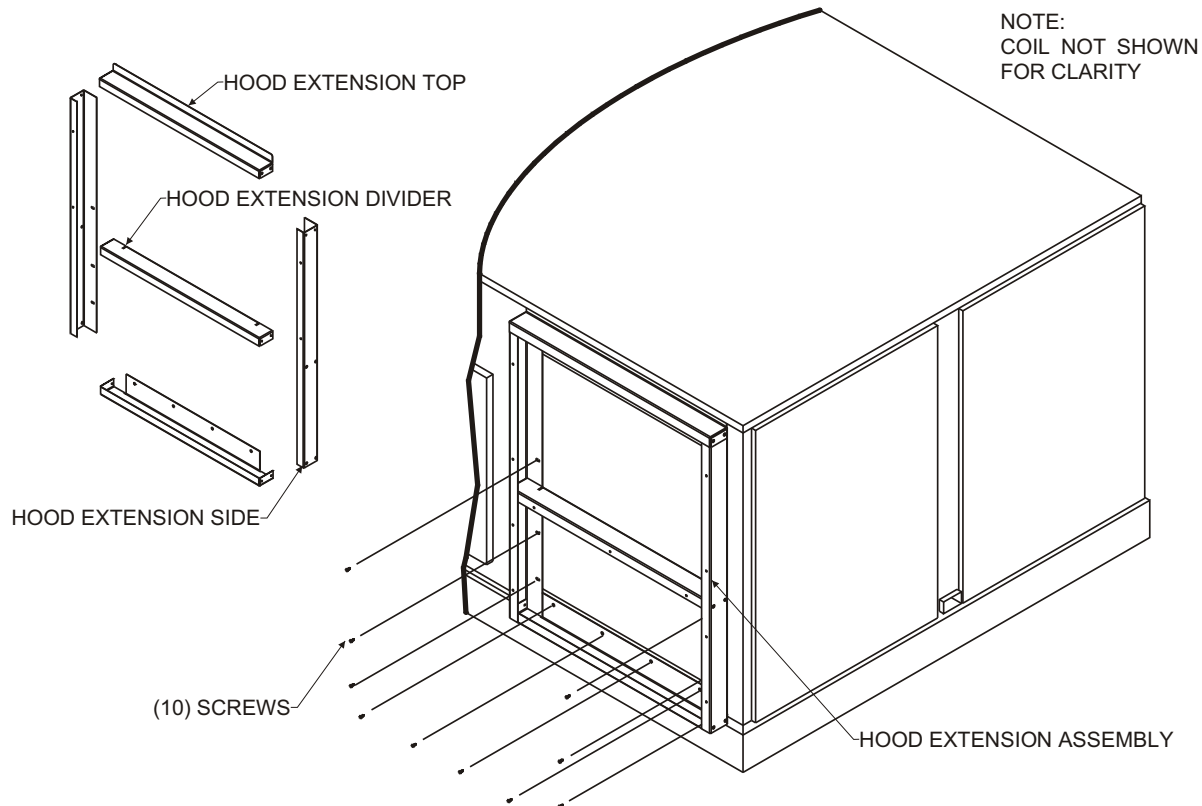


FIGURE 6

MODEL	"A"
3 - 6 TON	21.750 REF.
7 ½ TON	27.750 REF.

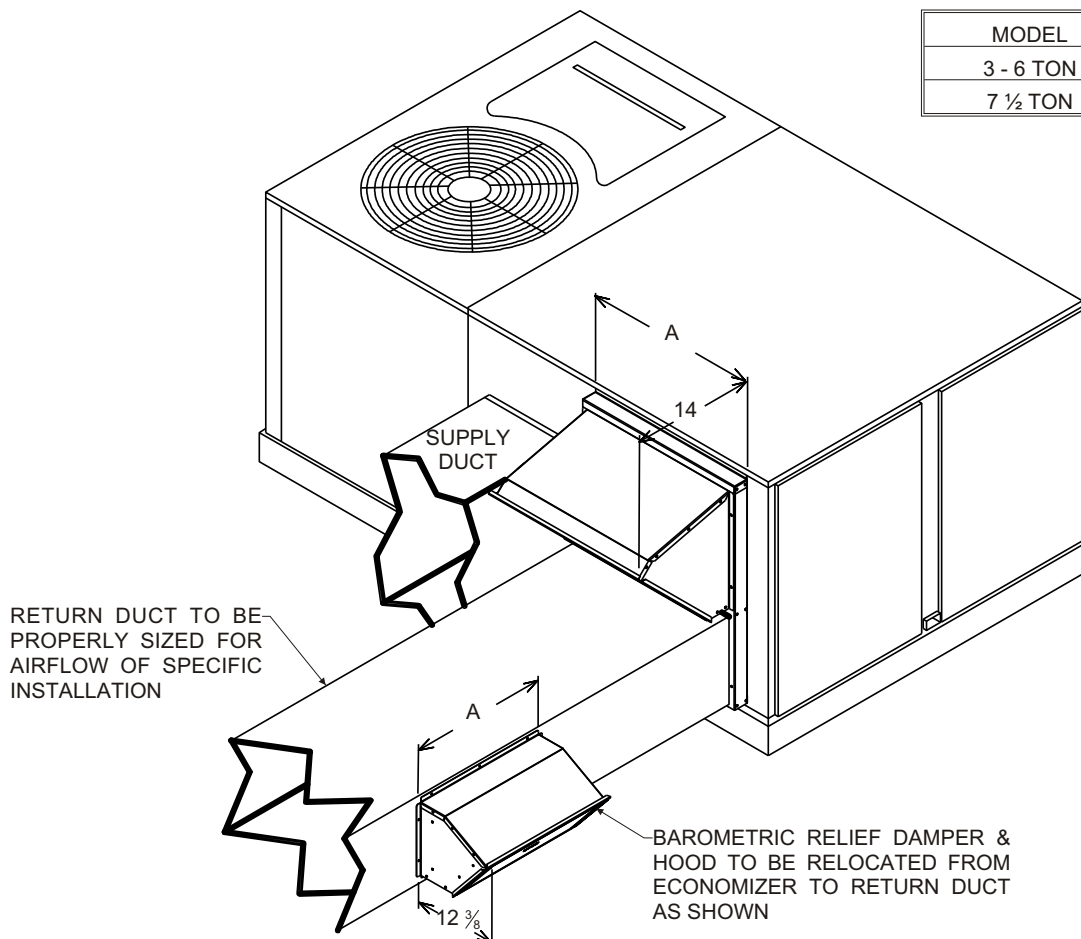
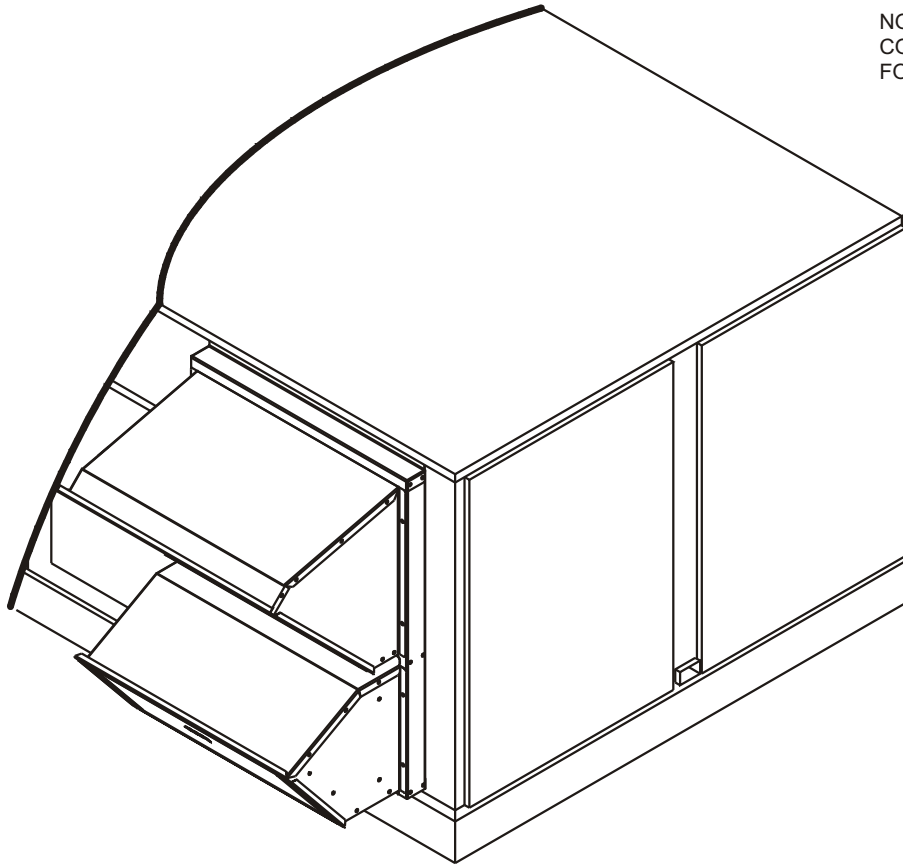


FIGURE 7

FIGURE 8

NOTE:
COIL NOT SHOWN
FOR CLARITY



STEP 19:

On downflow applications, the barometric relief hood mounts directly to the lower part of the HOOD EXTENSION opening using holes provided. On sideflow applications the barometric relief hood is attached to the return air duct.

STEP 20:

Mount the fresh air (upper) hood ((2) PERMANENT FILTER, (5) OA RAINHOOD ASSY – LEFT SIDE, (6) OA RAINHOOD ASSY – RIGHT SIDE, (7) OA RAINHOOD ASSY – BOTTOM, (8) OA RAINHOOD – TOP, (9) OA RAINHOOD – FILTER RETAINERS). Slide the fresh air hood flange under the HOOD EXTENSION top panel flange, align holes and secure with screw(s) provided (**SEE FIGURE 6**).

STEP 21:

Connect the (1) DISCHARGE AIR SENSOR to wires located on the blower support leg in the blower motor compartment (**SEE FIGURE 4**).

STEP 22:

Replace the BLOWER ACCESS PANEL with screws removed in **STEP 2**.

STEP 23:

Upon start-up check the economizer sequence of operation using the steps provided in these instructions. After testing unit operation and setting outside air damper minimum position, replace COIL/FILTER ACCESS panel with remaining screws.

DIRECT MOUNT ECONOMIZER SEQUENCE OF OPERATION

GENERAL

This accessory economizer package is designed to save energy costs by using outdoor air for cooling and ventilation in place of mechanical cooling whenever possible. The economizer continuously monitors indoor and outdoor air conditions and compares them to a user-selected setpoint to determine if free cooling is available.

ACCESSORIES

RXXR-AV02 — Dual Enthalpy Upgrade Kit

For maximum energy savings, this upgrade kit will allow the economizer to compare the outdoor air enthalpy to the return air enthalpy, instead of a user-selected setpoint to determine if "free cooling" is available.

RXXR-AR02 — Wall-Mounted Carbon Dioxide Sensor

For installations requiring Demand Control Ventilation (DCV) based upon indoor air levels of carbon dioxide (CO₂). When the unit supply fan is running, the CO₂ sensor modulates the outside air damper to maintain a user-selected CO₂ level inside the occupied space. Energy savings are achieved by not bringing in excessive amounts of outdoor air when the indoor air conditions are suitable. Energy savings can be substantial on buildings with highly variable occupancy rates.

Wall-Mounted Remote Potentiometer

For installations requiring remote adjustment of damper minimum position by the occupants, a remote potentiometer, such as the Honeywell S963B1128 can be used.

RXXR-BFG03/4C, RXXR-BGF03/4D, RXXR-BGF03/4Y — Power Exhaust Kit

For installations requiring more space static pressure relief than can be obtained with the standard barometric relief damper included with the economizer, a power exhaust kit can be added.

STARTUP

Attach connector from Economizer Controller to Rooftop Control Panel Connector and install discharge/mixed air temperature sensor per installation guide.

ADJUSTMENTS

5 potentiometers with screwdriver adjustment slots, starting from top of controller

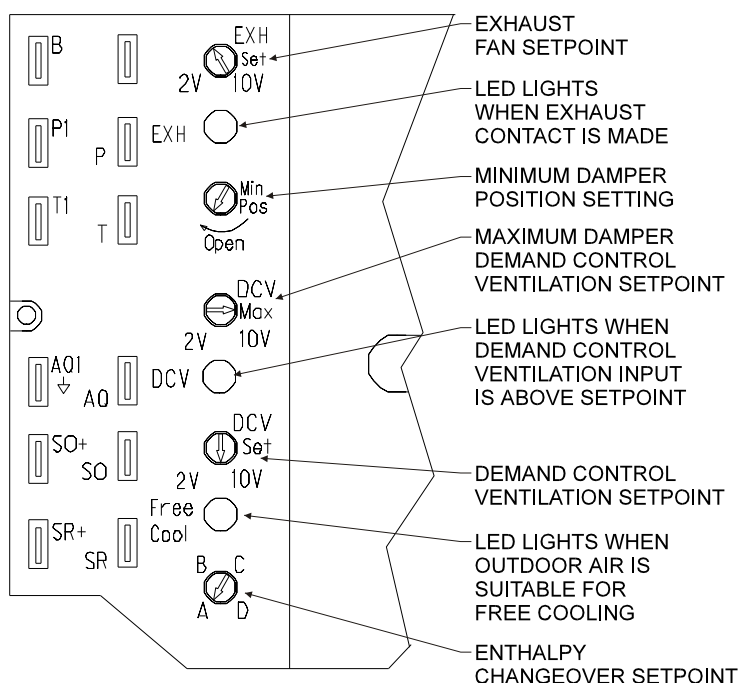
1. EXH Set — Adjustments for (optional) power exhaust

- The outside air damper position at which the power exhaust fan(s) will engage. The LED labeled EXH below the potentiometer adjustment will indicate when power exhaust is available. When the power exhaust call is made, the controller provides a 60 ±30 second delay before exhaust fan activation to allow the damper to reach the appropriate position.

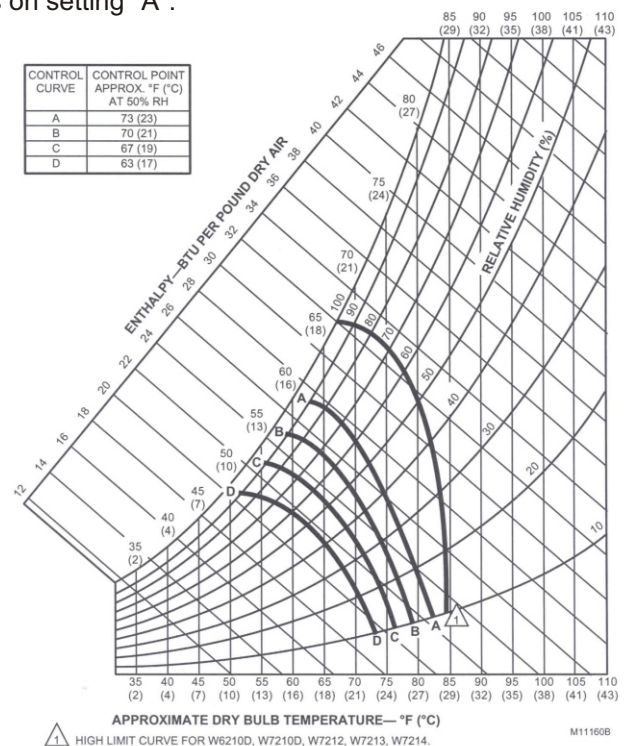
- Range of adjustment is from 0-100% (2-10V); in most applications the power exhaust is set to engage at about 70% outside air.

2. Min Pos — Outside Air Damper minimum position

- Adjust the minimum position potentiometer to allow the minimum amount of outdoor air, as required by local codes, to enter the building.



- B. Range of adjustment is from 0-100% (2-10V); in most applications the minimum position is adjusted to allow 10% to 25% outside air to enter the system.
 - C. The Outside Air Damper Minimum Position potentiometer can be adjusted at any time.
 - D. Whenever the "G" (supply fan) signal is present, the damper will open to this minimum position unless:
 - a. It may modulate to a greater position if overridden by the CO₂ sensor (DCV).
 - b. It may not open if overridden by the discharge air temperature sensor (Freeze Protect Mode).
3. DCV Max — Demand Control Ventilation (DCV) Maximum Setpoint
- A. The DCV maximum position potentiometer allows the installer to limit the amount of outdoor air flow into the building when the DCV overrides the mixed air sensor.
 - B. Setting the DCV maximum position of the damper prevents the introduction of large amounts of hot or cold air into the space.
 - C. Note: If the DCV maximum position is set below the outside air damper minimum position, the minimum position overrides the DCV maximum position (negating the function of the DCV).
4. DCV Set — Demand Control Ventilation (DCV) Setpoint
- A. The DCV can be any sensor that provides a 2-10Vdc output. The DCV modulates the outdoor damper to provide ventilation based on occupancy. Typically, a carbon dioxide (CO₂) sensor is used to indirectly monitor occupancy level.
 - B. No cooling signal (e.g. Y1, Y2) is required for the DCV to override the outdoor air damper when ventilation requires outdoor air.
 - C. The controller must receive a "G" (supply fan) signal to open the damper.
 - D. Range of adjustment is from 2 Volts to 10 Volts.
 - E. The DCV setpoint can be adjusted at any time.
 - F. The controller compares the CO₂ sensor input to the setpoint setting to determine the damper minimum position.
 - a. If the actual CO₂ level is below the setpoint, then the damper minimum position is determined by the damper minimum position potentiometer setting.
 - b. If the actual CO₂ level rises above the setpoint, then the damper minimum position is overridden proportionally more open.
 - c. If the discharge air temperature drops below 48°F (Freeze Protect Mode), the DCV input will be overridden and the damper may not open.
 - G. Compatible CO₂ sensors will have a 2-10Vdc output for a 0-1500 ppm CO₂ input.
 - H. Ensure proper polarity of the sensor wires when connecting to the economizer controller. Incorrect polarity negates the sensor signal.
5. Economizer Setpoint
- A. Only the coolest, driest outside air is used for economizer operation when the potentiometer is on setting "D". For greatest energy savings, the potentiometer is on setting "A".
 - B. Adjustment range is A, B, C, or D
 - a. Setting "A" = 73F db or 27 Btu/lbm @ 50% RH
 - b. Setting "B" = 70F db or 25 Btu/lbm @ 50% RH
 - c. Setting "C" = 67F db or 23 Btu/lbm @ 50% RH
 - d. Setting "D" = 63F db or 22 Btu/lbm @ 50% RH



- C. Economizer Setpoint potentiometer can be adjusted at any time.
- D. The controller compares the enthalpy sensor input with the economizer setpoint to determine if free cooling is available.
 - a. Single enthalpy strategy: If outdoor air enthalpy is lower than the setpoint, then free cooling is available. Note: The factory-installed 620-ohm resistor must be in place across terminals SR and SR+.
 - b. Dual enthalpy strategy: If outdoor air enthalpy is lower than return air enthalpy, then free cooling is available.
 - 1. Note: If using dual enthalpy, the Economizer Setpoint must be at the "D" setting.
 - 2. The factory-installed 620-ohm jumper must be removed to install the dual enthalpy upgrade kit.

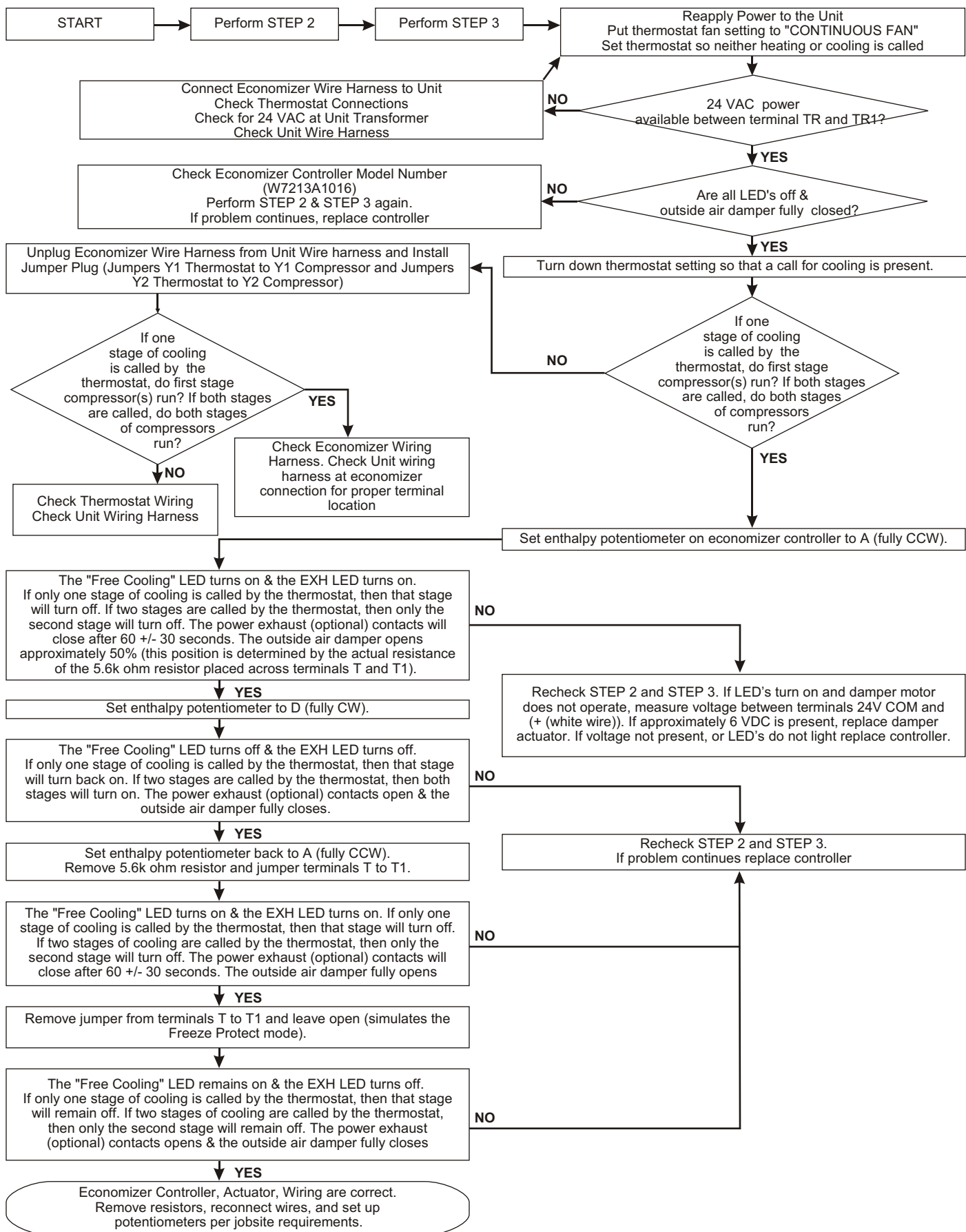
NORMAL OPERATION

1. Fan Only (G)
 - A. Damper will go to minimum position (in 90 seconds or less) whenever the "G" (supply fan) signal is present.
 - B. When "G" signal is removed, the outside air damper closes against blade seals for tight shutoff of outside air.
 - C. If the discharge air temperature drops below 48°F, then the control will override the minimum position setting and will modulate the outside air damper closed.
2. Call for First Stage of Cooling (Y1)
 - A. Economizer Unavailable (warm outdoor air). Compressor 1 is commanded on without delay.
 - B. Economizer Available (free cooling). The controller tries to maintain a discharge air temperature of 53°F ± 5 by modulating the outside air damper position.
3. Call for Second Stage of Cooling (Y2)
 - A. Economizer Unavailable (warm outdoor air). Compressor 2 is commanded on without delay.
 - B. Economizer Available (free cooling). Compressor 1 is commanded on without delay. The controller tries to maintain a discharge air temperature of 53°F ± 5 by modulating the outside air damper position. Compressor 2 is not activated in the economizer mode.
4. Call for Heat
 - A. Standard Air Conditioner with electric or gas heat. (W1 & W2)
 - a. The Thermostat controls the stages of heating directly.
 - b. If the control detects that the supply fan is on (through its "G" input), then the control will open the damper to minimum position.
 - c. If the discharge air temperature drops below 48°F, then the control will override the minimum position setting and will modulate the outdoor damper closed.
 - B. Heat Pump Operation (B)
 - a. The "B" signal from the Thermostat allows operation of the compressors to provide heating without delay.
 - b. If the control detects that the supply fan is on (through its "G" input), then the control can open the damper to minimum position.
 - c. If the discharge air temperature drops below 48°F, then the control will override the minimum position setting and will modulate the outdoor damper closed.
5. Low Ambient Compressor Lockout – None present.

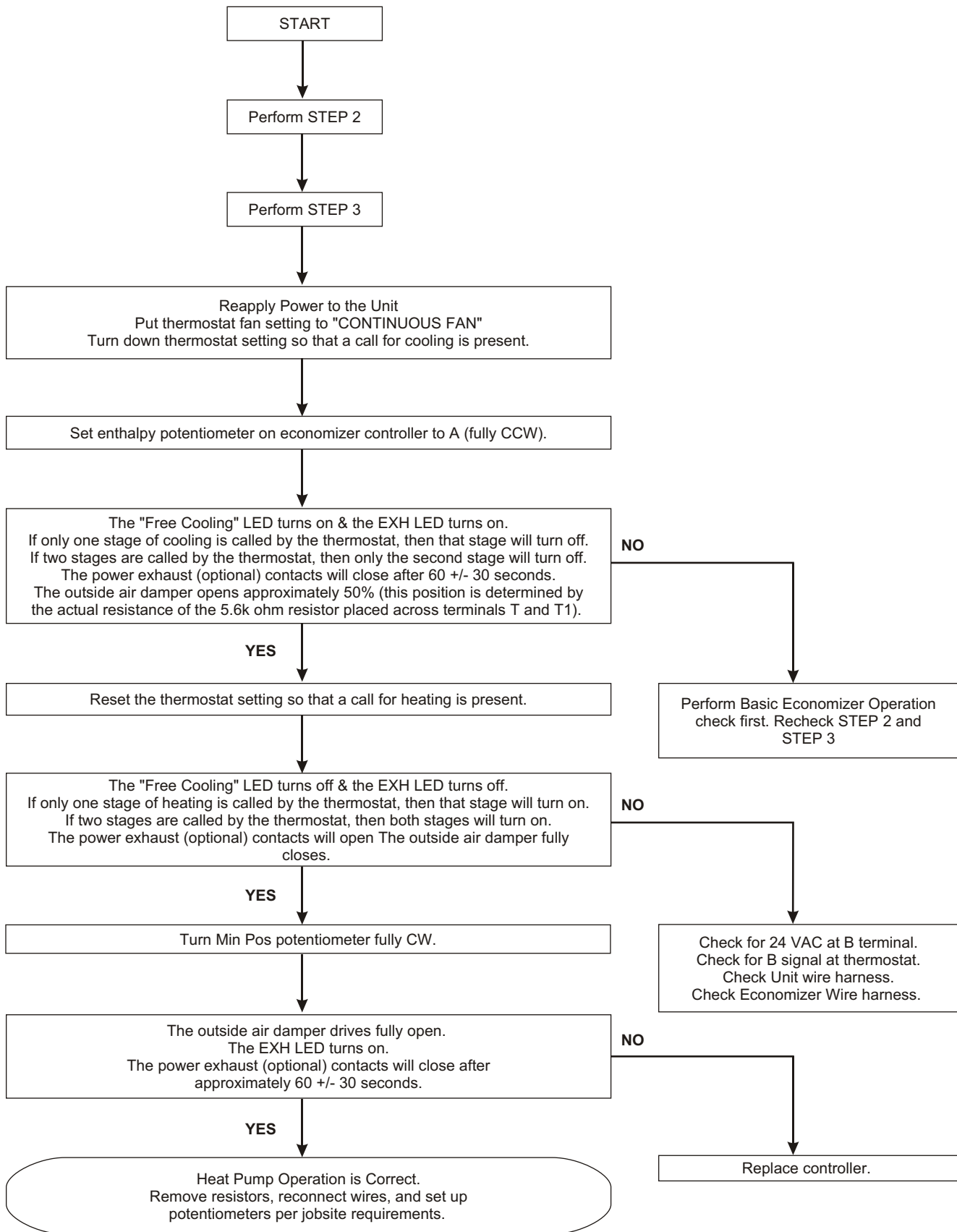
TROUBLESHOOTING

1. Checkout requires a handheld multimeter, 9V battery, a 5.6k ohm ¼ watt resistor, a 1.2k ohm ¼ watt resistor, a jumper wire with ¼" quick connect terminals, and the 620 ohm resistor that is factory-installed across terminals SR+ and SR. The terminal names below reference the economizer controller. Use the following flowcharts for to diagnose unit.
2.
 - a. Disconnect power to the unit.
 - b. Jumper P to P1 (factory installed jumper is normally present).
 - c. Remove outdoor air enthalpy sensor from terminals SO+ and SO and install the 1.2k ohm resistor.
 - d. Put 620 ohm resistor across terminals SR+ and SR (factory installed 620 ohm resistor is normally present and can be used).
 - e. Put 5.6k ohm resistor across T and T1.
3.
 - a. Turn (**EXH Set**) Exhaust fan Setpoint potentiometer fully CCW.
 - b. Turn (**Min Pos**) Minimum Outside Air Damper potentiometer fully CCW.
 - c. Turn (**DCV Max**) Demand Control Ventilation Maximum potentiometer fully CW.
 - d. Turn (**DCV Set**) Demand Control Ventilation Setpoint potentiometer fully CCW.
 - e. Turn enthalpy potentiometer to "D".

BASIC ECONOMIZER OPERATION

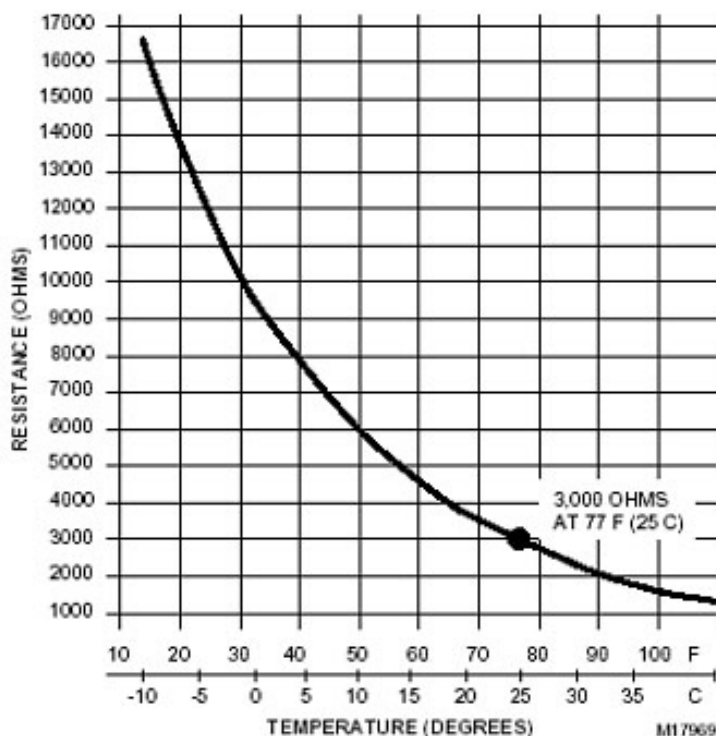


HEAT PUMP OPERATION **(Perform BASIC ECONOMIZER OPERATION check first)**



Use the following graph and the multimeter to verify proper operation of the mixed air / discharge air temperature sensor.

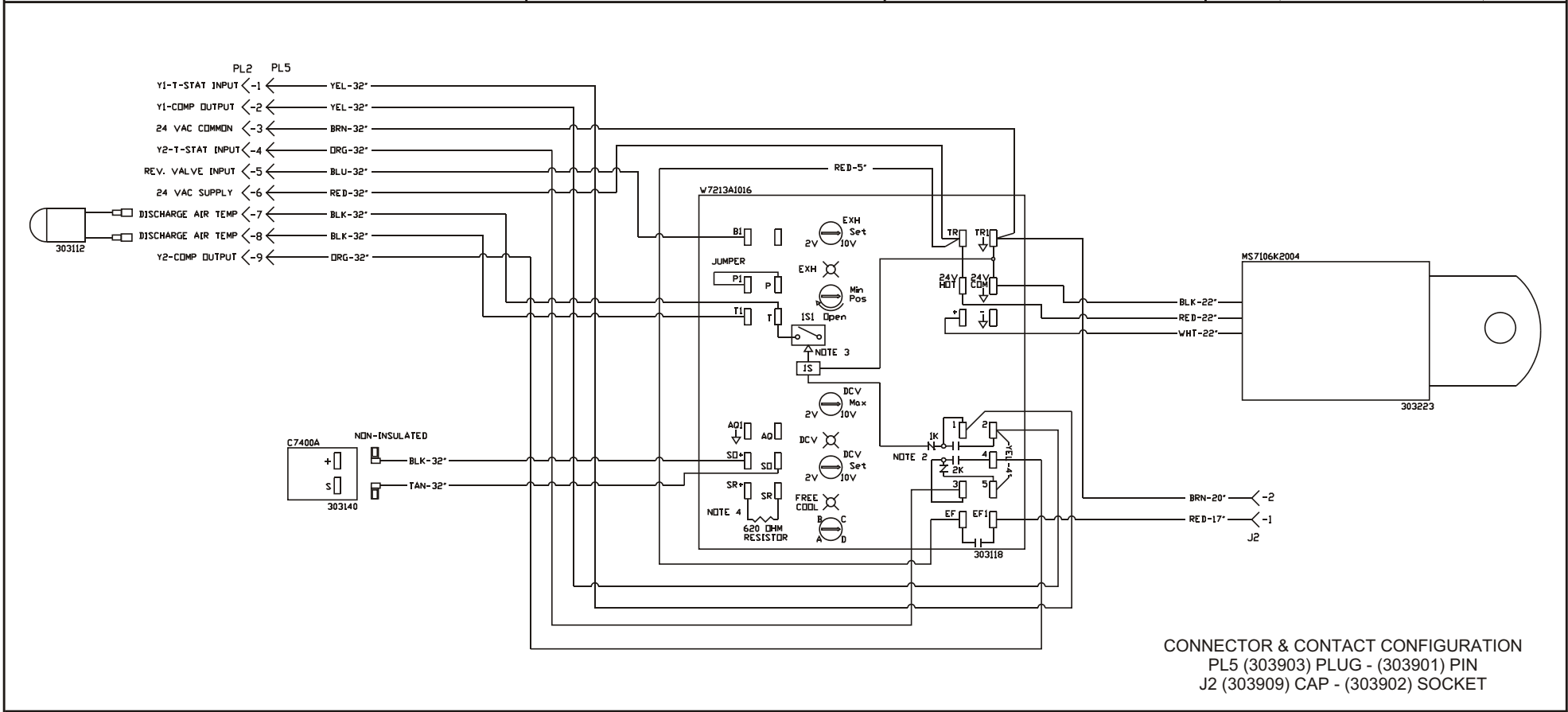
Measure the resistance (ohms) of the mixed air / discharge air temperature sensor with the multimeter. Look up the equivalent temperature on the graph. This should be the same as temperature the mixed air / discharge air sensor is detecting. If it is not, replace the mixed air /discharge air sensor.



NOTES

1. The mist eliminator (Permanent Outdoor Air Filter), is of aluminum mesh construction and should be cleaned by flushing regularly with warm soapy water. The replacement mist eliminator size is listed on the first page of these instructions.
2. When diagnosing the system, the best results are obtained by first putting the fan setting on the Thermostat to the "Continuous Fan" mode.
3. Operation of the optional power exhaust only depends upon the supply fan running and the damper position (it is possible to set the minimum position high enough to engage the power exhaust in the heating mode).
4. This economizer requires a two-stage thermostat.
5. Upon loss of power to the unit or economizer, the outside air damper will spring close shut in about 5 seconds.
6. Compressor Time Delays, Compressor Interstage Delays, Compressor Low Ambient Lockouts, etc. are not provided by the economizer controller.

HARNESS ENDS AT PL5	COMPONENT CODE 9RT1H Mixed Air Sensor C7400A Fresh Air Sensor J2 Damper Actuator Cap MS7106K Female A/C Unit Plug PL2 Female A/C Unit Plug PL5 Male Economizer Plug W7213A Logic Module	WIRE COLOR CODE BLK Black BLU Blue BRN Brown GRN Green GRY Gray ORG Orange RED Red TAN Tan VIO Violet WHT White YEL Yellow	Revision	Change	Date
			A	Changed Mixed Air Sensor	02-23-06



- Notes:
- Unit wiring shown as reference only. Check unit wiring for actual unit wiring.
 - Relays 1K and 2K actuate when the Outdoor Air Enthalpy is lower than the Return Air Enthalpy.
 - 1S is an electronic switch which closes when powered by a 24 VAC input.
 - Factory installed resistor should be removed only if C7400 Differential Enthalpy Sensor is added.

Modulating Gear Economizer RKKA / RJKA / RLKA 036-090 RKMA / RJMA / RLMA 036-090	
Rooftop Systems, Inc. 2405 McIver Lane Carrollton, Texas 75006 Phone (972) 247-7447 Fax (972) 243-0940	Date: March 1, 2006
	Supersedes: 01-16-06
	Drawn by:
	Unit # 60-364-08/20
Diagram# 6036420W	

INSTALLATION INSTRUCTIONS

MODELS RXRD-MDCM3 & RXRD-MFCM3

VERTICAL AIRFLOW ECONOMIZERS

⚠ WARNING

THIS ACCESSORY IS TO BE INSTALLED BY A QUALIFIED, LICENSED SERVICE PERSON. TO AVOID UNSATISFACTORY OPERATION OR DAMAGE TO THE PRODUCT AND POSSIBLE UNSAFE CONDITIONS, INCLUDING ELECTRICAL SHOCK, REFRIGERANT LEAKAGE AND FIRE, THE INSTALLATION INSTRUCTIONS PROVIDED WITH THIS ACCESSORY MUST BE STRICTLY FOLLOWED AND THE PARTS SUPPLIED USED WITHOUT SUBSTITUTION. DAMAGE TO THE PRODUCT RESULTING FROM NOT FOLLOWING THE INSTRUCTIONS OR USING UNAUTHORIZED PARTS MAY BE EXCLUDED FROM THE MANUFACTURER'S WARRANTY COVERAGE.

⚠ WARNING

DISCONNECT ELECTRICAL POWER TO THE UNIT. FAILURE TO DO SO CAN CAUSE ELECTRICAL SHOCK RESULTING IN PERSONAL INJURY OR DEATH.

TOOLS REQUIRED FOR INSTALLATION:

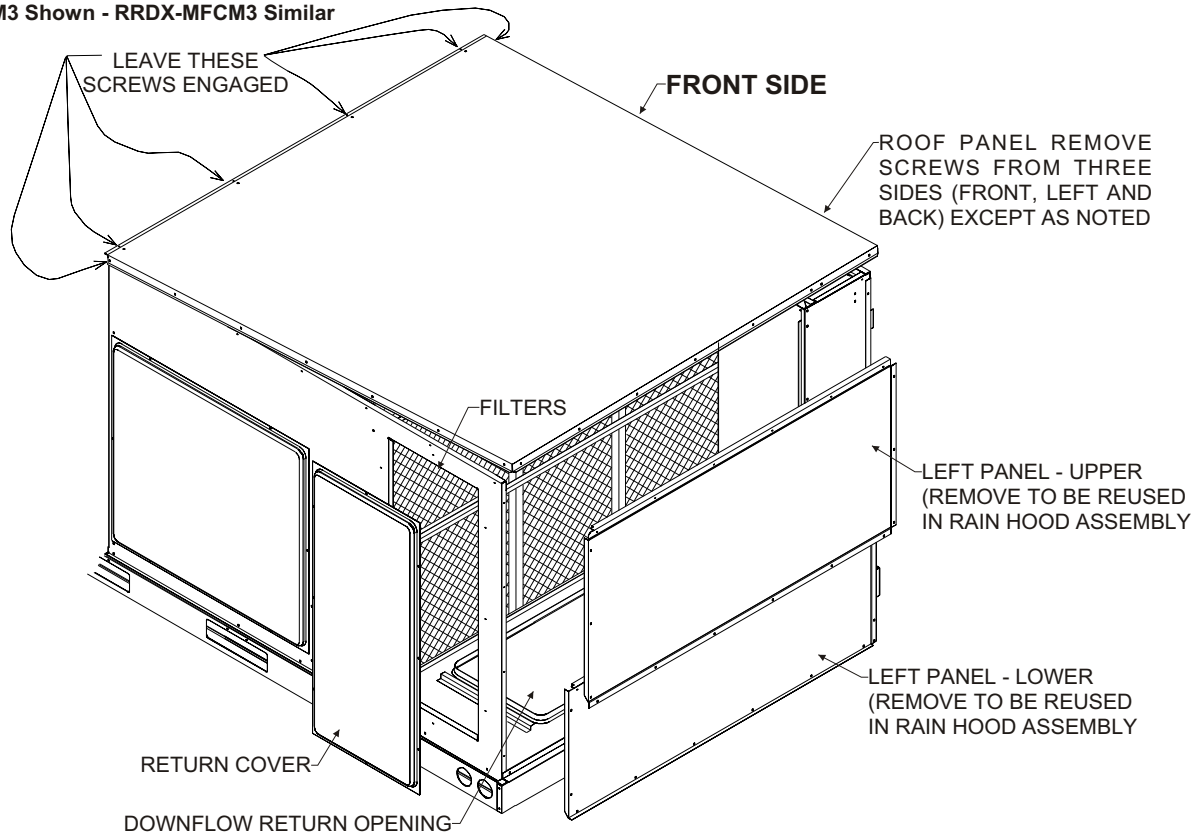
$\frac{3}{8}$ " electric drill with $\frac{5}{16}$ " socket

Small flat blade (0.125" wide) screwdriver

TABLE 1

PACKAGE CONTENTS		RXRD-MDCM3 economizer with controller, actuator, and outside enthalpy sensor attached	RXRD-MFCM3 economizer with controller, actuator, and outside enthalpy sensor attached
ITEM	DESCRIPTION	PART No.	PART No.
1	Discharge Air Sensor (Hardware Bag)	6036413 / 3112	6036415 / 3112
2	(2) Permanent Filters	6036413 / 8567 (11.875" X 23.875")	6036415 / 8568 (23.875" X 23.875")
3	Spotweld Assy - Bird Screen	6036413 / BSWA	6036415 / BSWA
4	Exhaust Air Rainhood Assy – Birdscreen Front Support	6036413 / EHB2	6036415 / EHB2
5	OA Rainhood Assy - Left Side	6036413 / EHSL	6036415 / EHSL
6	OA Rainhood Assy - Right Side	6036413 / EHSR	6036415 / EHSR
7	Exhaust Air Rainhood - Left Side	6036413 / EHS2L	6036415 / EHS2L
8	Exhaust Air Rainhood – Right Side	6036413 / EHS2R	6036415 / EHS2R
9	OA Filter Rail Assy	6036413 / EHT2	6036415 / EHT2
10	OA Rainhood Assy – Top	6036413 / EHT	6036415 / EHT
11	OA Rainhood - Front Filter Support	6036413 / EHB	6036415 / EHB
12	Hardware Bag	6036413 / HDW	6036415 / HDW

FIGURE 1
RXRD-MDCM3 Shown - RRDx-MFCM3 Similar



A1010-01

STEP 1:

Immediately upon receipt, all cartons and contents should be inspected for transit damage. Units with damaged cartons should be opened immediately. If damage is found, it should be noted on the delivery papers and a damage claim filed with the last carrier. Compare carton(s) contents to PACKAGE CONTENTS List (**TABLE 1**) above to note any missing items.

STEP 2:

Remove RETURN COVER, PANEL – TOP LEFT, and PANEL – LEFT BOTTOM SECTION from the unit and retain for reuse (**SEE FIGURE 1**). Retain screws.

STEP 3:

Remove screws from 3 sides of ROOF PANEL so that it can be raised during economizer insertion.

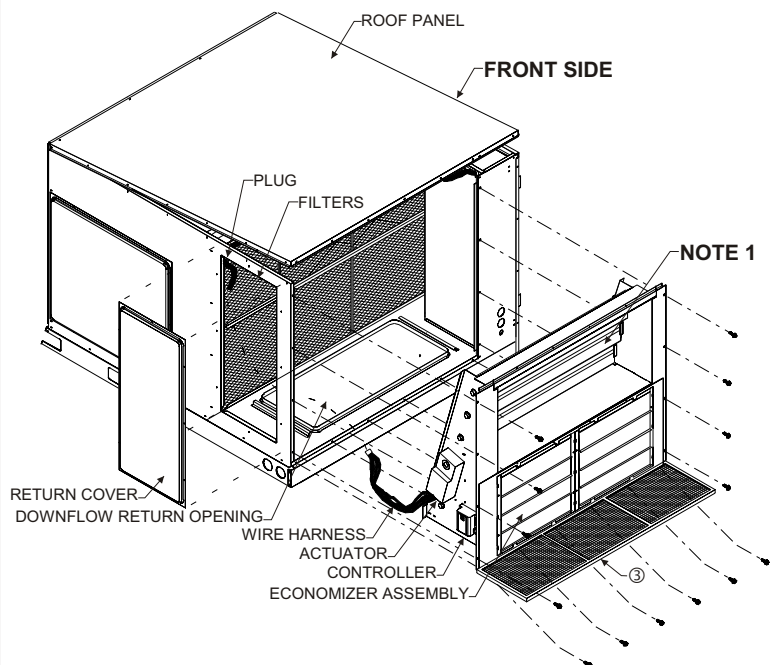
NOTE 1:

Remove shipping bracket, ② PERMANENT FILTERS, ⑤ OA RAINHOOD - LEFT SIDE, ⑥ OA RAINHOOD - RIGHT SIDE, ⑦ EXHAUST AIR RAINHOOD - LEFT SIDE and ⑧ EXHAUST AIR RAINHOOD - RIGHT SIDE from fresh air opening. (**SEE FIGURE 2**).

STEP 4:

Remove jumper plug and slide economizer into unit return air section (**SEE FIGURE 2**). After the economizer is installed, connect unit ECONOMIZER PLUG to economizer mating plug. Save the jumper plug in this compartment for diagnostic purposes.

FIGURE 2



A1011-01

STEP 5:

Secure economizer and ③ SPOTWELD ASSY - BIRD SCREEN along bottom with six screws as shown (SEE FIGURE 2). See TABLE 1 for identification.

STEP 6:

Fasten ⑦ EXHAUST AIR RAINHOOD - LEFT SIDE and ⑧ EXHAUST AIR RAINHOOD - RIGHT SIDE to barometric relief opening (lower opening) on the economizer (SEE FIGURE 3). Fasten with six screws. See FIGURE 4 for identification of EXHAUST AIR RAINHOODS.

STEP 7:

Fasten ④ EXHAUST AIR RAINHOOD ASSY - BIRDSCREEN FRONT SUPPORT under edge of LEFT PANEL - LOWER using six screws. Do not install a screw in the rightmost hole in the panels at this time.

STEP 8:

Fasten LEFT PANEL - LOWER and ④ EXHAUST AIR RAINHOOD ASSY - BIRDSCREEN FRONT SUPPORT to the top of the ⑦ EXHAUST AIR RAINHOOD - LEFT SIDE and ⑧ EXHAUST AIR RAINHOOD - RIGHT SIDE which was previously installed on the unit (SEE STEP 7).

STEP 9:

Attach ⑨ OA FILTER RAIL ASSY to economizer center support, ⑦ EXHAUST AIR RAINHOOD - LEFT SIDE and ⑧ EXHAUST AIR RAINHOOD - RIGHT SIDE and LEFT PANEL - LOWER using screws provided.

STEP 10:

Position the ⑩ OA RAINHOOD ASSY - TOP under edge of ROOF PANEL. Do not install screws at this time.

STEP 11:

Fasten ⑤ OA RAINHOOD - LEFT SIDE and ⑥ OA RAINHOOD - RIGHT SIDE to unit using screws provided (2 each on RXRD-MDCM3, 3 each on RXRD-MFCM3).

STEP 12:

Slide ② PERMANENT FILTERS between ⑤ OA RAINHOOD - LEFT SIDE and ⑥ OA RAINHOOD - RIGHT SIDE back into the ⑨ OA FILTER RAIL ASSY.

STEP 13:

Fasten ⑪ OA RAINHOOD - FRONT FILTER SUPPORT to PANEL - TOP LEFT with six screws. The bottom lip should support the ② PERMANENT FILTERS. Do not install a screw in the rightmost hole in the panels at this time.

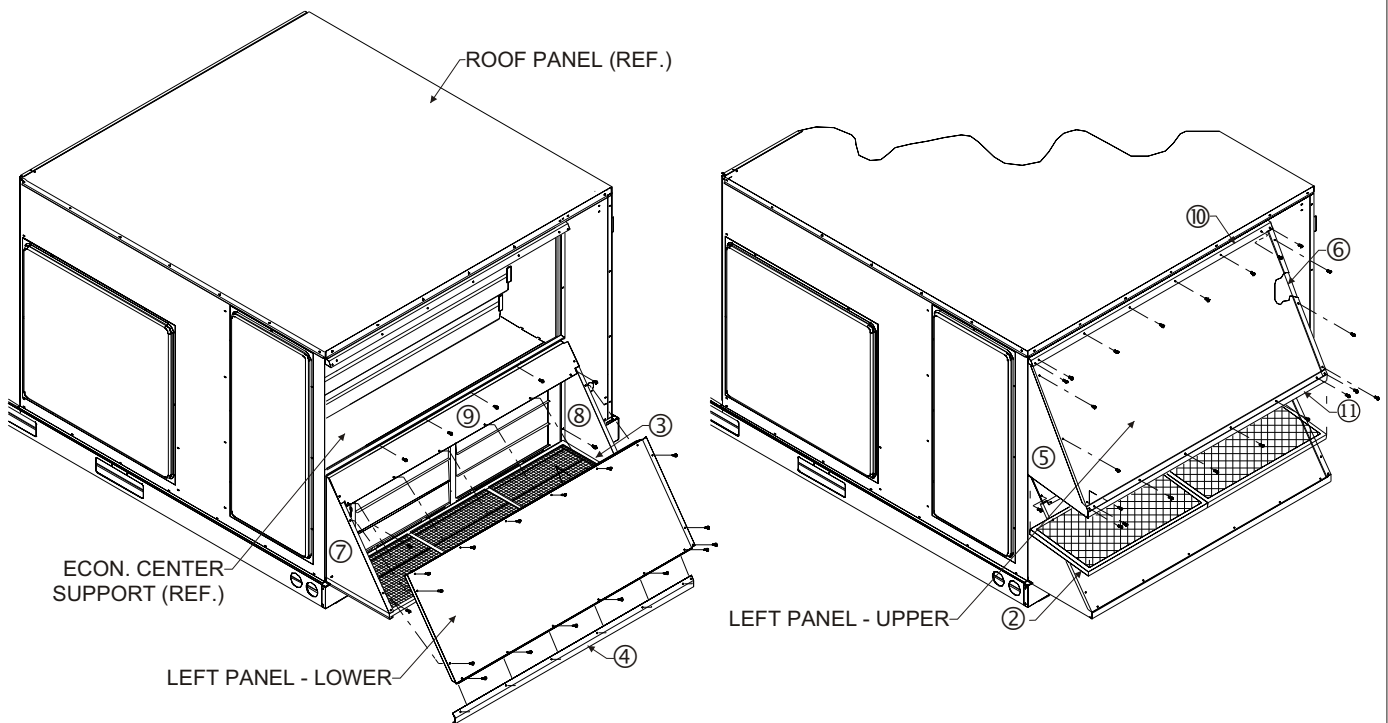
STEP 14:

Fasten PANEL - TOP LEFT to ⑤ OA RAINHOOD - LEFT SIDE and ⑥ OA RAINHOOD - RIGHT SIDE and ⑪ OA RAINHOOD - FRONT FILTER SUPPORT using screws (12 on RXRD-MDCM3, 16 on RXRD-MFCM3).

STEP 15:

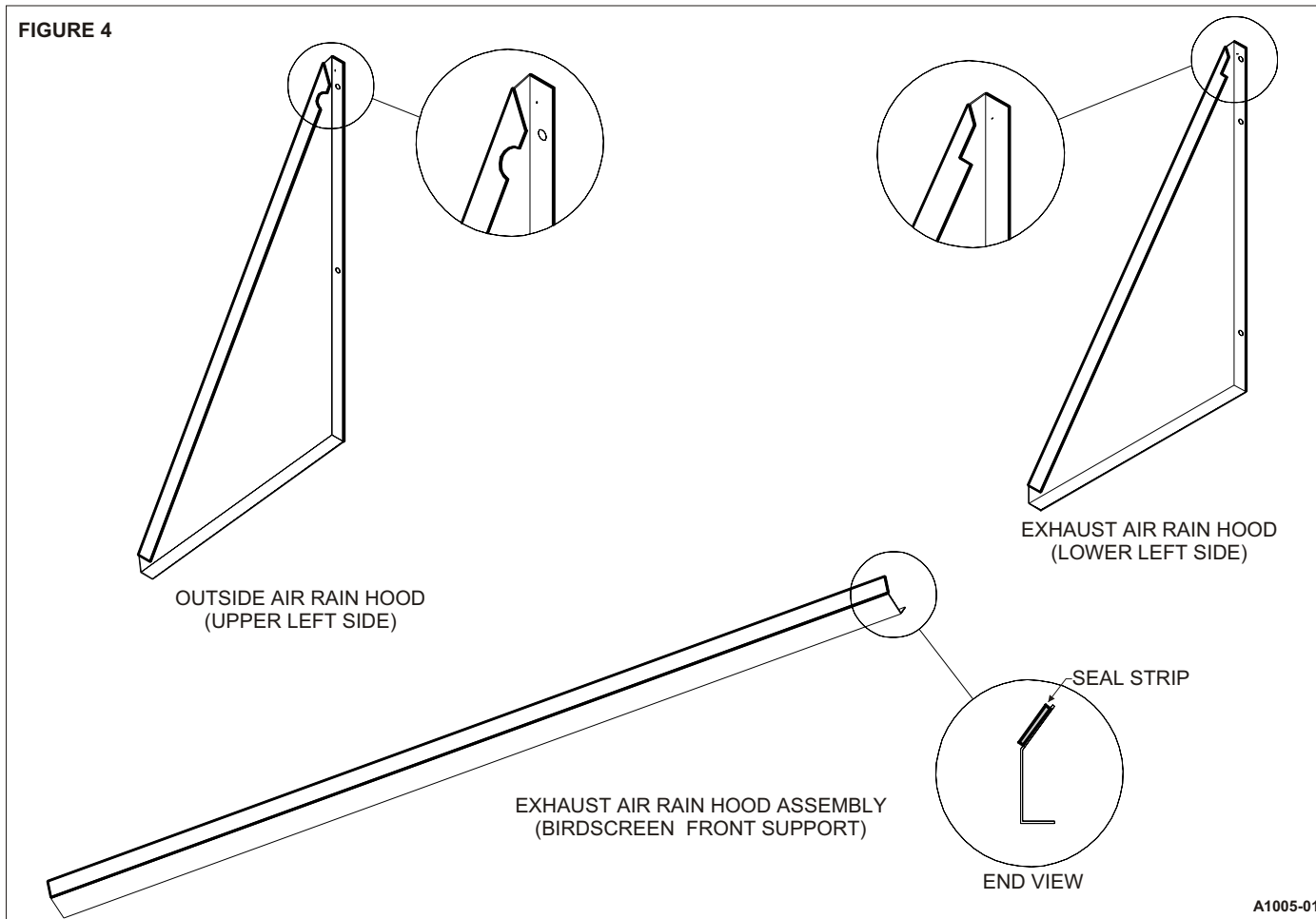
Re-secure ROOF PANEL using the washer head screws that were removed in STEP 3 from the ROOF PANEL.

FIGURE 3
RXRD-MDCM3 Shown - RRD-MFCM3 Similar
(See Table 1 for identification of parts)



A1012-01

FIGURE 4



STEP 16:
Remove the BLOWER MOTOR ACCESS PANEL (SEE FIGURE 5).

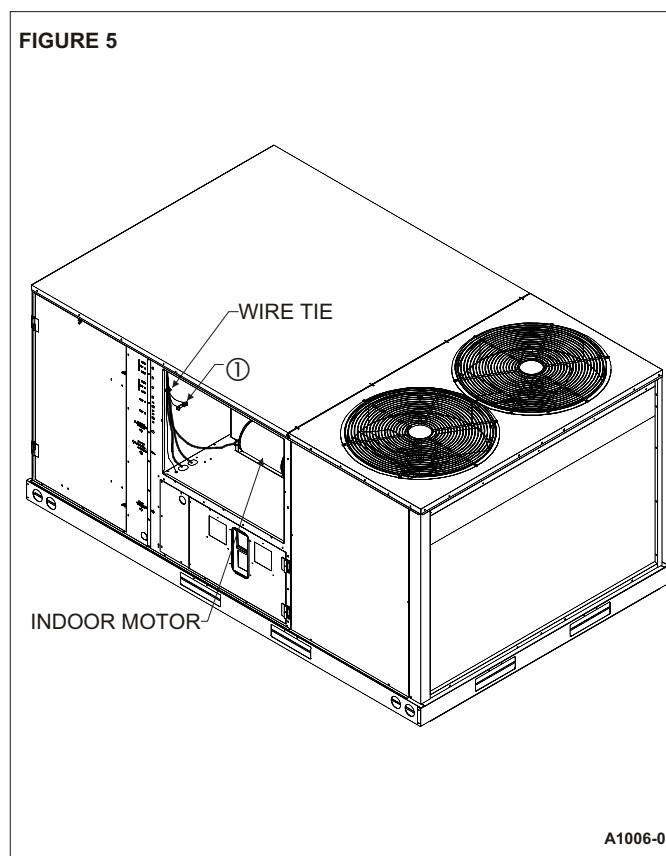
STEP 17:
Connect the ① DISCHARGE AIR SENSOR to wires 51 and 52 located in the blower motor compartment.

NOTE:
Mixed air sensor should be secured with the included wire tie to avoid entanglement with the blower and direct contact with any sheet metal surfaces.

STEP 18:
Replace the BLOWER MOTOR ACCESS PANEL.

STEP 19:
Upon start-up check the economizer sequence of operation using the steps provided in these instructions. After testing unit operation and setting outside air damper minimum position, replace RETURN COVER with remaining screws.

FIGURE 5



DIRECT MOUNT ECONOMIZER SEQUENCE OF OPERATION

GENERAL

This accessory economizer package is designed to save energy costs by using outdoor air for cooling and ventilation in place of mechanical cooling whenever possible. The economizer continuously monitors indoor and outdoor air conditions and compares them to a user-selected setpoint to determine if free cooling is available.

ACCESSORIES

RXXR-AV02 — Dual Enthalpy Upgrade Kit

For maximum energy savings, this upgrade kit will allow the economizer to compare the outdoor air enthalpy to the return air enthalpy, instead of a user-selected setpoint to determine if "free cooling" is available.

RXXR-AR02 - Wall-Mounted Carbon Dioxide Sensor

For installations requiring Demand Control Ventilation (DCV) based upon indoor air levels of carbon dioxide (CO₂). When the unit supply fan is running, the CO₂ sensor modulates the outside air damper to maintain a user-selected CO₂ level inside the occupied space. Energy savings are achieved by not bringing in excessive amounts of outdoor air when the indoor air conditions are suitable. Energy savings can be substantial on buildings with highly variable occupancy rates.

Wall-Mounted Remote Potentiometer

For installations requiring remote adjustment of damper minimum position by the occupants, a remote potentiometer, such as the Honeywell S963B1128 can be used.

RXXR-BFF02C, RXXR-BFF02D, RXXR-BFF02Y — Power Exhaust Kit

For installations requiring more space static pressure relief than can be obtained with the standard barometric relief damper included with the economizer, a power exhaust kit can be added.

STARTUP

Attach connector from Economizer Controller to Rooftop Control Panel Connector and install discharge/mixed air temperature sensor per installation guide.

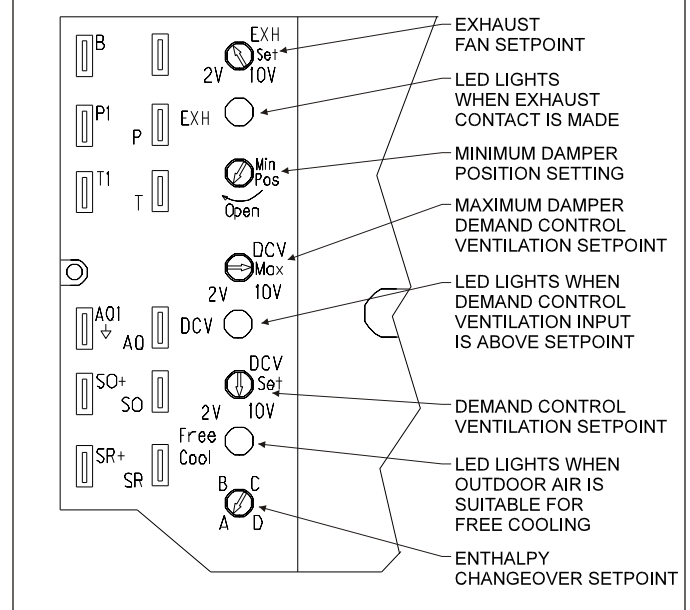
ADJUSTMENTS

5 potentiometers with screwdriver adjustment slots, starting from top of controller

1. EXH Set — Adjustments for (optional) power exhaust
 - A. The outside air damper position at which the power exhaust fan(s) will engage. The LED labeled EXH below the potentiometer adjustment will indicate when power exhaust is available. When the power exhaust call is made, the controller provides a 60 ±30 second delay before exhaust fan activation to allow the damper to reach the appropriate position.
 - B. Range of adjustment is from 0-100% (2-10V); in most applications the power exhaust is set to engage at about 70% outside air.

- B. Range of adjustment is from 0-100% (2-10V); in most applications the minimum position is adjusted to allow 10% to 25% outside air to enter the system.
 - C. The Outside Air Damper Minimum Position potentiometer can be adjusted at any time.
 - D. Whenever the "G" (supply fan) signal is present, the damper will open to this minimum position unless:
 - a. It may modulate to a greater position if overridden by the CO₂ sensor (DCV).
 - b. It may not open if overridden by the discharge air temperature sensor (Freeze Protect Mode).
3. DCV Max — Demand Control Ventilation (DCV) Maximum Setpoint
 - A. The DCV maximum position potentiometer allows the installer to limit the amount of outdoor air flow into the building when the DCV overrides the mixed air sensor.
 - B. Setting the DCV maximum position of the damper prevents the introduction of large amounts of hot or cold air into the space.
 - C. Note: If the DCV maximum position is set below the outside air damper minimum position, the minimum position overrides the DCV maximum position (negating the function of the DCV).
 4. DCV Set — Demand Control Ventilation (DCV) Setpoint
 - A. The DCV can be any sensor that provides a 2-10Vdc output. The DCV modulates the outdoor damper to provide ventilation based on occupancy. Typically, a carbon dioxide (CO₂) sensor is used to indirectly monitor occupancy level.
 - B. No cooling signal (e.g. Y1, Y2) is required for the DCV to override the outdoor air damper when ventilation requires outdoor air.
 - C. The controller must receive a "G" (supply fan) signal to open the damper.
 - D. Range of adjustment is from 2 Volts to 10 Volts.
 - E. The DCV setpoint can be adjusted at any time.

FIGURE 6



F. The controller compares the CO₂ sensor input to the setpoint setting to determine the damper minimum position.

- If the actual CO₂ level is below the setpoint, then the damper minimum position is determined by the damper minimum position potentiometer setting.
- If the actual CO₂ level rises above the setpoint, then the damper minimum position is overridden proportionally more open.
- If the discharge air temperature drops below 48°F (Freeze Protect Mode), the DCV input will be overridden and the damper may not open.

G. Compatible CO₂ sensors will have a 2-10Vdc output for a 0-1500 ppm CO₂ input.

H. Ensure proper polarity of the sensor wires when connecting to the economizer controller. Incorrect polarity negates the sensor signal.

5. Economizer Setpoint

A. Only the coolest, driest outside air is used for economizer operation when the potentiometer is on setting "D". For greatest energy savings, the potentiometer is on setting "A".

B. Adjustment range is A, B, C, or D

- Setting "A" = 73F db or 27 Btu/lbm @ 50% RH
- Setting "B" = 70F db or 25 Btu/lbm @ 50% RH
- Setting "C" = 67F db or 23 Btu/lbm @ 50% RH
- Setting "D" = 63F db or 22 Btu/lbm @ 50% RH

C. Economizer Setpoint potentiometer can be adjusted at any time.

D. The controller compares the enthalpy sensor input with the economizer setpoint to determine if free cooling is available.

a. Single enthalpy strategy: If outdoor air enthalpy is lower than the setpoint, then free cooling is available. Note: The factory-installed 620-ohm resistor must be in place across terminals SR and SR+.

b. Dual enthalpy strategy: If outdoor air enthalpy is lower than return air enthalpy, then free cooling is available.

1. Note: If using dual enthalpy, the Economizer Setpoint must be at the "D" setting.

2. The factory-installed 620-ohm jumper must be removed to install the dual enthalpy upgrade kit.

NORMAL OPERATION

1. Fan Only (G)

A. Damper will go to minimum position (in 90 seconds or less) whenever the "G" (supply fan) signal is present.

B. When "G" signal is removed, the outside air damper closes against blade seals for tight shutoff of outside air.

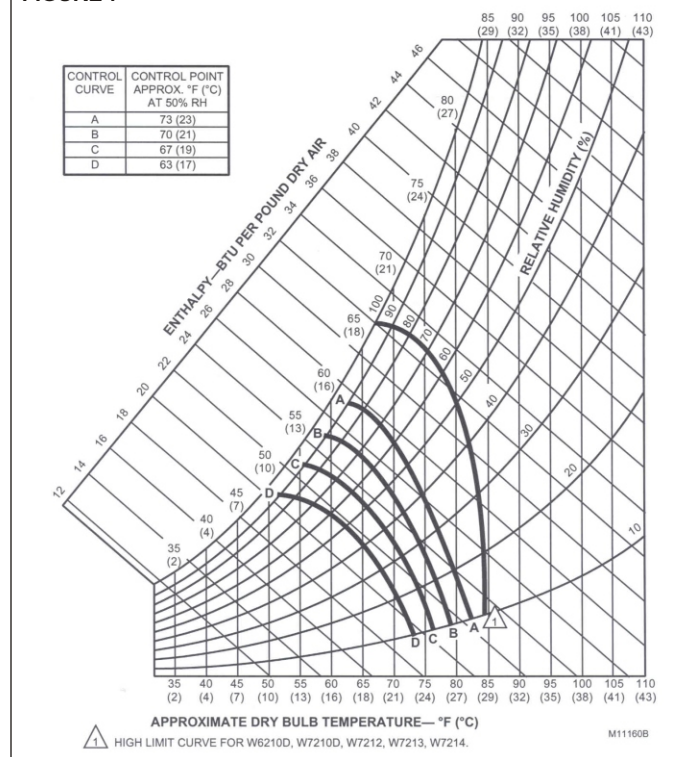
C. If the discharge air temperature drops below 48°F, then the control will override the minimum position setting and will modulate the outside air damper closed.

2. Call for First Stage of Cooling (Y1)

A. Economizer Unavailable (warm outdoor air). Compressor 1 is commanded on without delay.

B. Economizer Available (free cooling). The controller tries to maintain a discharge air temperature of 53°F ± 5 by modulating the outside air damper position.

FIGURE 7



3. Call for Second Stage of Cooling (Y2)

A. Economizer Unavailable (warm outdoor air). Compressor 2 is commanded on without delay.

B. Economizer Available (free cooling). Compressor 1 is commanded on without delay. The controller tries to maintain a discharge air temperature of 53°F ± 5 by modulating the outside air damper position. Compressor 2 is not activated in the economizer mode.

4. Call for Heat

A. Standard Air Conditioner with electric or gas heat. (W1 & W2)

a. The Thermostat controls the stages of heating directly.

b. If the control detects that the supply fan is on (through its "G" input), then the control will open the damper to minimum position.

c. If the discharge air temperature drops below 48°F, then the control will override the minimum position setting and will modulate the outdoor damper closed.

B. Heat Pump Operation (B)

a. The "B" signal from the Thermostat allows operation of the compressors to provide heating without delay.

b. If the control detects that the supply fan is on (through its "G" input), then the control can open the damper to minimum position.

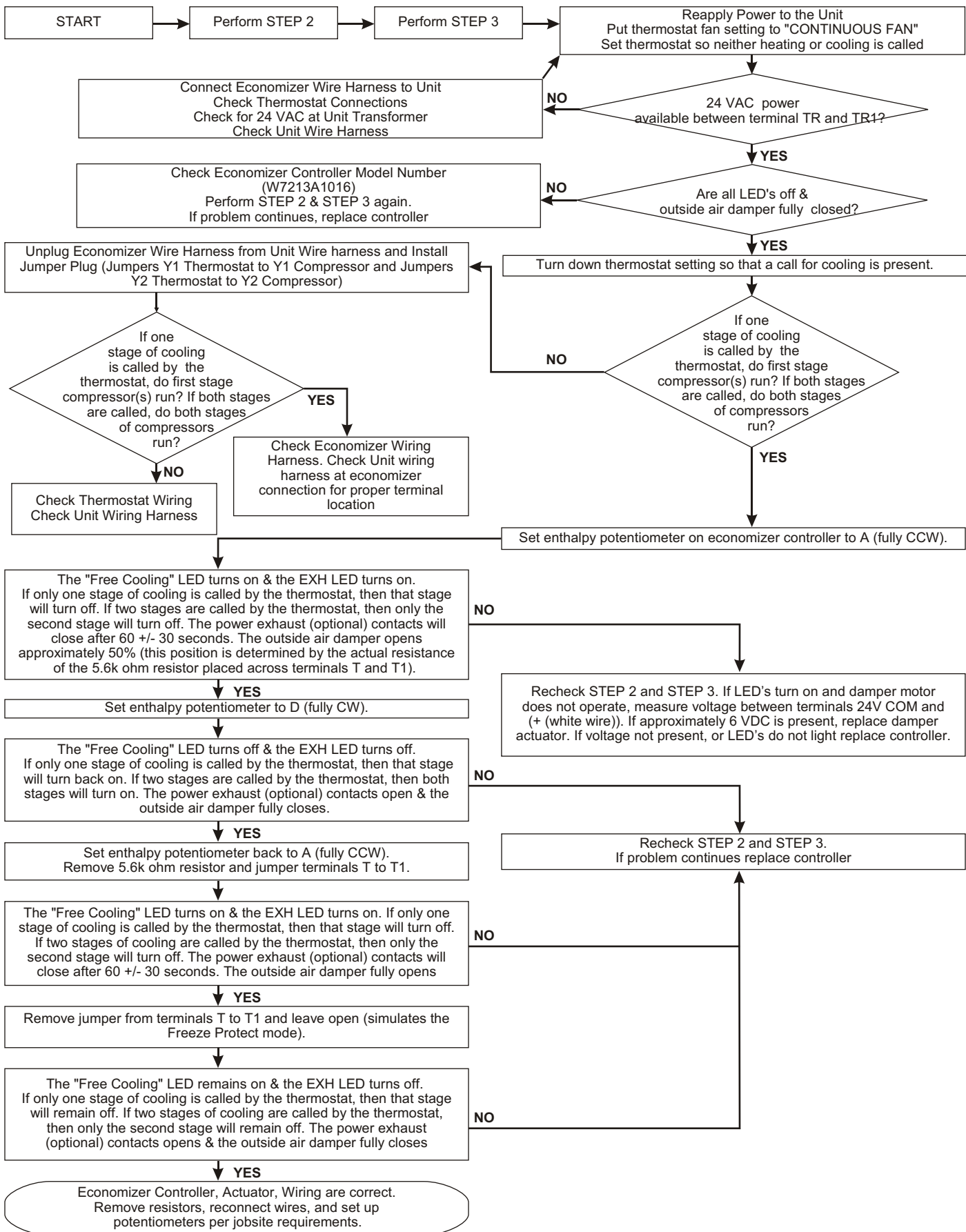
c. If the discharge air temperature drops below 48°F, then the control will override the minimum position setting and will modulate the outdoor damper closed.

5. Low Ambient Compressor Lockout – None present.

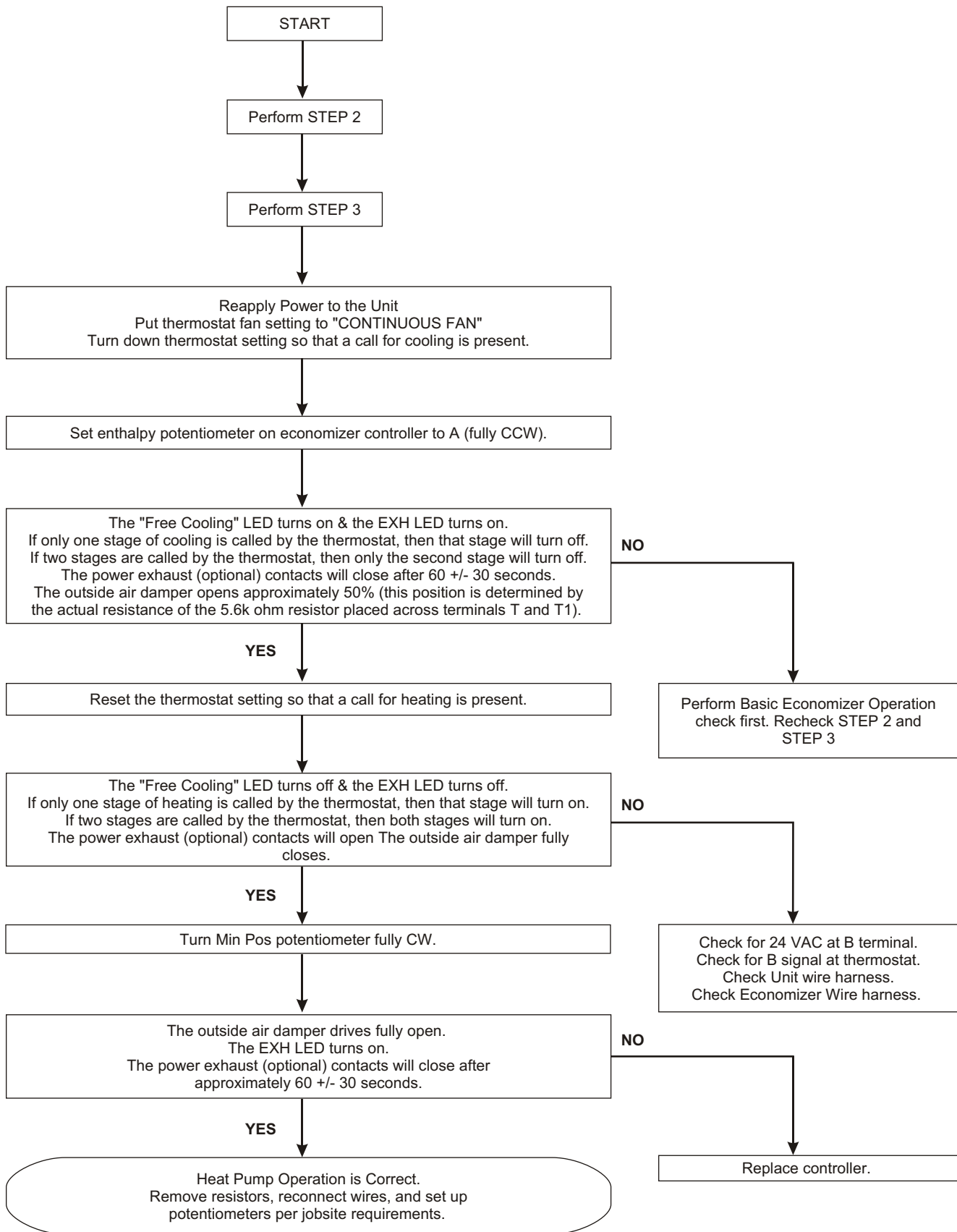
TROUBLESHOOTING

1. Checkout requires a handheld multimeter, 9V battery, a 5.6k ohm .25 watt resistor, a 1.2k ohm .25 watt resistor, a jumper wire with .25" quick connect terminals, and the 620 ohm resistor that is factory-installed across terminals SR+ and SR. The terminal names below reference the economizer controller. Use the following flowcharts for to diagnose unit.
2.
 - a. Disconnect power to the unit.
 - b. Jumper P to P1 (factory installed jumper is normally present).
 - c. Remove outdoor air enthalpy sensor from terminals SO+ and SO and install the 1.2k ohm resistor.
 - d. Put 620 ohm resistor across terminals SR+ and SR (factory installed 620 ohm resistor is normally present and can be used).
 - e. Put 5.6k ohm resistor across T and T1.
3.
 - a. Turn (**EXH Set**) Exhaust fan Setpoint potentiometer fully CCW.
 - b. Turn (**Min Pos**) Minimum Outside Air Damper potentiometer fully CCW.
 - c. Turn (**DCV Max**) Demand Control Ventilation Maximum potentiometer fully CW.
 - d. Turn (**DCV Set**) Demand Control Ventilation Setpoint potentiometer fully CCW.
 - e. Turn enthalpy potentiometer to "D".

BASIC ECONOMIZER OPERATION

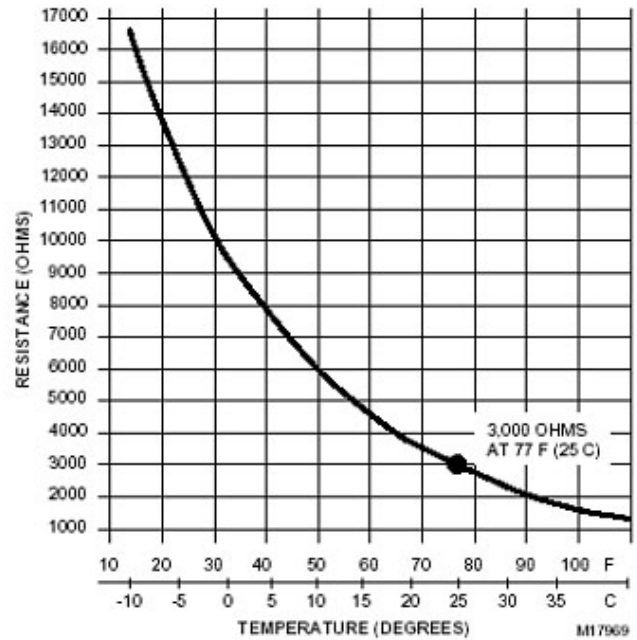


HEAT PUMP OPERATION (Perform BASIC ECONOMIZER OPERATION check first)



Use the following graph and the multimeter to verify proper operation of the mixed air / discharge air temperature sensor.

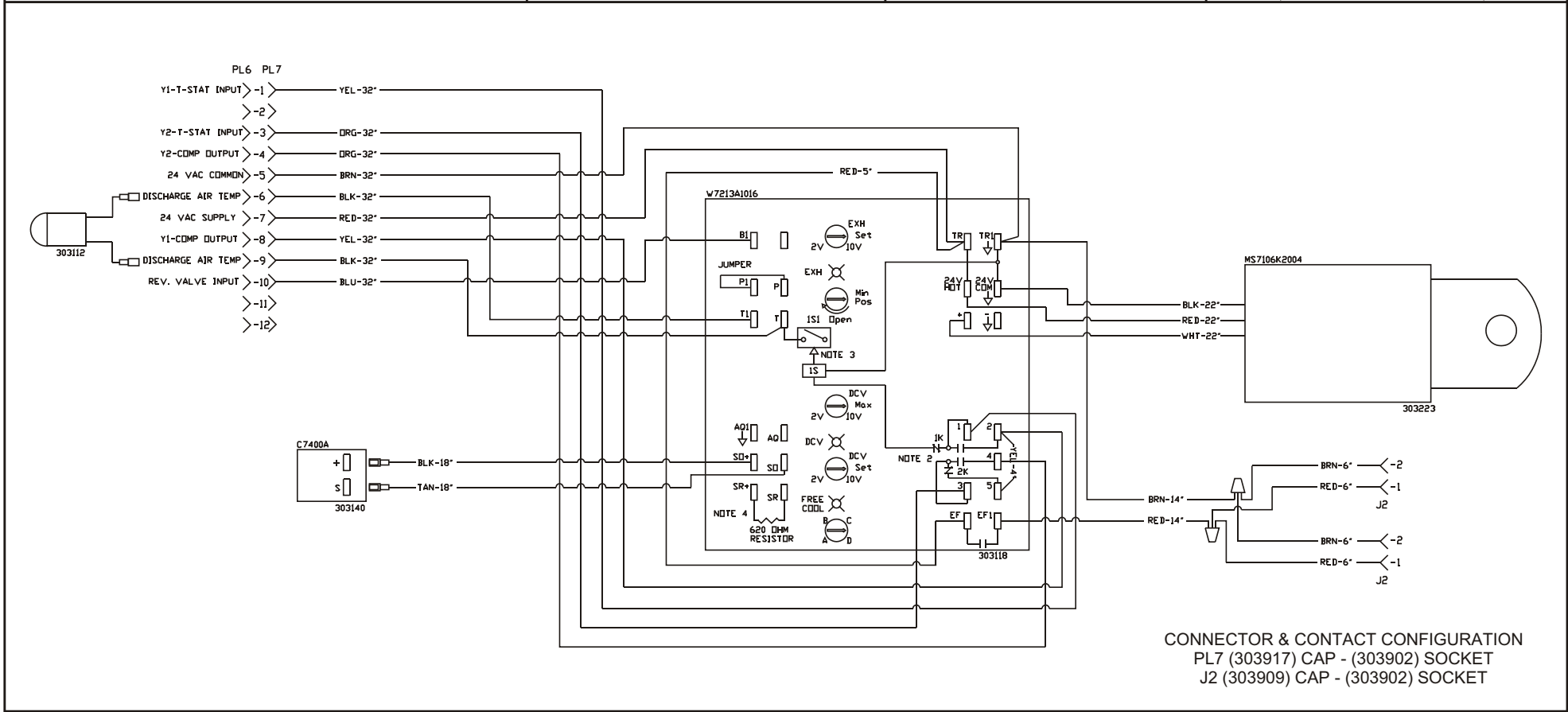
Measure the resistance (ohms) of the mixed air / discharge air temperature sensor with the multimeter. Look up the equivalent temperature on the graph. This should be the same as temperature the mixed air / discharge air sensor is detecting. If it is not, replace the mixed air / discharge air sensor.



NOTES

1. The mist eliminator (Permanent Outdoor Air Filter), is of aluminum mesh construction and should be cleaned by flushing regularly with warm soapy water. The replacement mist eliminator size is listed on the first page of these instructions.
2. When diagnosing the system, the best results are obtained by first putting the fan setting on the Thermostat to the "Continuous Fan" mode.
3. Operation of the optional power exhaust only depends upon the supply fan running and the damper position (it is possible to set the minimum position high enough to engage the power exhaust in the heating mode).
4. This economizer requires a two-stage thermostat.
5. Upon loss of power to the unit or economizer, the outside air damper will spring close shut in about 5 seconds.
6. Compressor Time Delays, Compressor Interstage Delays, Compressor Low Ambient Lockouts, etc. are not provided by the economizer controller.

HARNESS ENDS AT PL7	COMPONENT CODE C7400A Fresh Air Sensor 9RT1H Mixed Air Sensor J2 Power Exhaust Cap MS7106K Damper Actuator 24v PL6 Male A/C Unit Plug PL7 Female Economizer Cap W7213A Logic Module	WIRE COLOR CODE BLK Black BLU Blue BRN Brown GRN Green GRY Gray ORG Orange RED Red TAN Tan VIO Violet WHT White YEL Yellow	Revision	Change	Date
			A	Changed Mixed Air Sensor	02-23-06
			B	Exchanged wire 3 & 4	03-29-06



- Notes:
- Unit wiring shown as reference only. Check unit wiring for actual unit wiring.
 - Relays 1K and 2K actuate when the Outdoor Air Enthalpy is lower than the Return Air Enthalpy.
 - 1S is an electronic switch which closes when powered by a 24 VAC input.
 - Factory installed resistor should be removed only if C7400 Differential Enthalpy Sensor is added.
 - Y2 must be energized for the compressor to operate.

Modulating Gear Economizer RKKB / RLKB 090-240	
Rooftop Systems, Inc. 2405 McIver Lane Carrollton, Texas 75006 Phone (972) 247-7447 Fax (972) 243-0940	Date: March 29, 2006
	Supersedes: 03-01-06
	Drawn by:
	Unit # 60-364-13/15
Diagram# 6036413BW	

INSTALLATION INSTRUCTIONS FOR AUXILIARY ELECTRIC HEATER KITS

▲ Recognize this symbol as an indication of Important Safety Information!

IMPORTANT: TO ENSURE PROPER INSTALLATION AND OPERATION, PLEASE READ ALL INSTRUCTIONS PRIOR TO ASSEMBLY, INSTALLATION, OPERATION, MAINTENANCE OR REPAIR OF THIS PRODUCT. AFTER UNPACKING THE HEATER KIT, INSPECT ALL PARTS FOR DAMAGE PRIOR TO INSTALLATION AND START UP.

INTRODUCTION

The information contained in these instructions has been prepared to assist in the proper installation and operation of the auxiliary electric heaters. Improper installation can result in unsatisfactory operation or dangerous conditions not covered by the unit warranty and may invalidate the Underwriters Laboratories recognition.

CHECKING PRODUCT RECEIVED

Upon receiving the heater kit, inspect it for any shipping damage. Claims for damage should be filed immediately with the shipping company.

Check heater kit model number to determine that it is the correct series for the unit, as shown on the unit rating plate, and is of the desired voltage and KW size.

APPLICATION

These auxiliary electric resistance heater kits are designed for installation in the discharge air compartment of the indoor blower. Improper usage can cause results which may be dangerous. Do not use heater kits other than those referenced on the unit rating plate.

Clearance to combustible material for the unit and first three (3) feet of duct is "0" inches.

OPERATION

The heater elements are wired through controllers operated by the 24 volt thermostat circuit. To insure blower operation, the blower is also controlled by the heater controllers. The heater controllers will turn the blower and first stage heater "on" first and will turn the heater and blower "off" last when the thermostat is satisfied.

TOOLS NEEDED

The following tools can be helpful in installing the kits:

1. Slotted screwdrivers and 5/16" nut driver.
2. Some kits will require the use of allen wrenches.
3. Needle-nose pliers.
4. Wire cutters and strippers.

INDOOR BLOWER SPEED

Refer to the blower airflow tables in the unit installation instructions to set the proper blower speed for your airflow and static pressure requirements.

▲ WARNING

DISCONNECT ALL POWER BEFORE STARTING HEATER KIT INSTALLATION. FAILURE TO DO SO CAN RESULT IN SEVER ELECTRICAL SHOCK OR DEATH.

ELECTRICAL WIRING

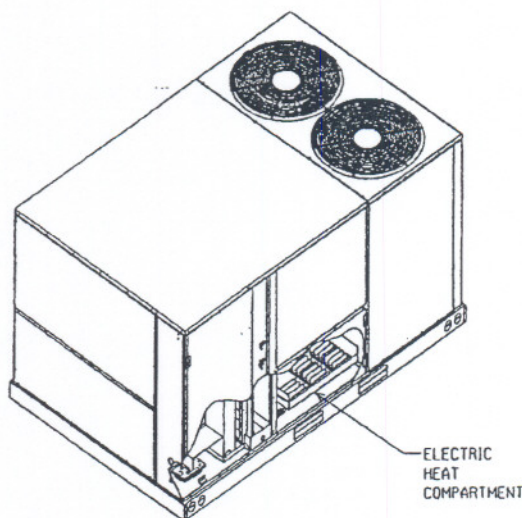
Field wiring must comply with the National Electrical Code (NEC in Canada) and any local ordinances that may apply.

POWER WIRING

1. If the unit has been in operation without an electric heater kit installed, it may be necessary to change the field installed power wiring. The added current of the electric heater kit may require larger gauge wiring than that required for the unit alone. Refer to the unit rating plate or installation instructions for the required supply circuit size and overcurrent protection. A wire sizing table follows for reference
2. It is important that proper electrical power is available at the heater kit terminals. Voltage should not vary more than 10% from that marked on the unit rating plate. Phase voltages must be balanced within 3%.
3. A properly sized disconnect switch shall be located within sight of the unit or as required by local codes.
4. Power wiring must be run in grounded, rain-tight conduit.
5. Refer to the unit installation instructions for power entry location. The high voltage field installed power supply circuit should be connected to the line side of the terminal block located on the heater kit. Consult the heater kit wiring diagram.

FOR FIELD INSTALLATION OF AN ELECTRIC HEATER KIT, FOLLOW THE INSTRUCTIONS BELOW:

- a. Removing screws as required, open heater access door and detach adjacent power entry panel.
- b. Remove wires to unit contactor (1L1, 1L2, 1L3) from the unit terminal block on the left side of the electric heat compartment. Remove and discard the terminal block and the adjacent ground lug.
- c. Remove the heater kit block-off panel and install the heater kit in its place using 9 of the 12 screws previously removed.
- d. Connect the unit contactor wires (1L1, 1L2, 1L3) to the compressor fuse block on the heater kit.
- e. Re-install the power entry panel & run conduit and the proper size field wiring through the opening in the panel.
- f. Connect field wiring to the power terminal block located on the electric heater kit. Connect ground wire to the adjacent ground lug.
- g. Connect heater kit control plug to the receptacle on the control wiring harness.
- h. Check all electrical connections including factory wiring within the unit and make sure all connections are tight and properly located.
- i. Close heater access door and secure with the screws previously removed.
- j. Affix heater kit wiring diagram to inside of control / filter access door.



1. All low voltage wiring must be routed into the low voltage connection area and not into the power wiring or heater control area.
2. For thermostat low voltage connections, see unit installation instructions.
3. Thermostat heat anticipator should be adjustable for a minimum range of .10 - 1.20. Typical settings are as follows:

THERMOSTAT HEAT ANTICIPATOR SETTING*

SETTING	1	2
	.7	.7 & .4

*NOTES

1. Normally, the first stage heat has a fixed setting.
2. Some thermostats have no adjustable second stage heat anticipator setting indicator. Follow the instructions in these specific thermostats to get proper operation.
3. Replace the control box cover and control compartment access panel after all wiring is completed.
4. Check unit for proper operation.

WIRE SIZE - 75°C INSULATION FOR 1% VOLTAGE DROP

SUPPLY CIRCUIT CAPACITY	COPPER WIRE- AWG/MCM				
	SUPPLY WIRE LENGTH FEET				
	100	150	200	250	300
15	10	8	6	6	6
20	8	6	4	4	4
25	8	6	4	4	3
30	6	4	4	3	2
35	6	4	3	2	1
40	6	4	3	2	1
45	4	3	2	1	1/0
50	4	3	2	1	1/0
60	4	2	1	1/0	2/0
70	3	2	1/0	2/0	3/0
80	3	1	1/0	2/0	3/0
90	2	1/0	2/0	3/0	4/0
100	2	1/0	2/0	3/0	4/0
110	1	2/0	3/0	4/0	250
125	1	2/0	3/0	4/0	250
150	1/0	3/0	4/0	250	300
175	2/0	4/0	250	300	350
200	3/0	4/0	300	350	400
225	4/0	250	350	450	500

GFCI Convenience Outlet for Maverick I™ Units

MPS007 to 020 ton

Group: **MPS**

Part Number: **IM 905**

Date: **January 2008**

Installation



WARNING

Failure to follow these instructions can result in improper installation, adjustment, service, or maintenance, and can result in fire, electrical shock, property damage, personal injury, or death. These instructions are intended as an aid to qualified service personnel for proper installation, adjustment, and operation of this kit. Read carefully and thoroughly before attempting installation, adjustment, or operation.

Parts List

Description	Part Number	Quantity
Receptacle/Ground Fault	45-41954-01	1
Cover	45-41953-02	1
Outlet Box	45-41952-02	1
Wire	AS-50217-25-AH	1
Wire	AS-50221-25-AH	1
Wire	AS-50519-25-AH	1
Strain Relief	45-18753-01	1
Wire Tie	64-17606-01	2

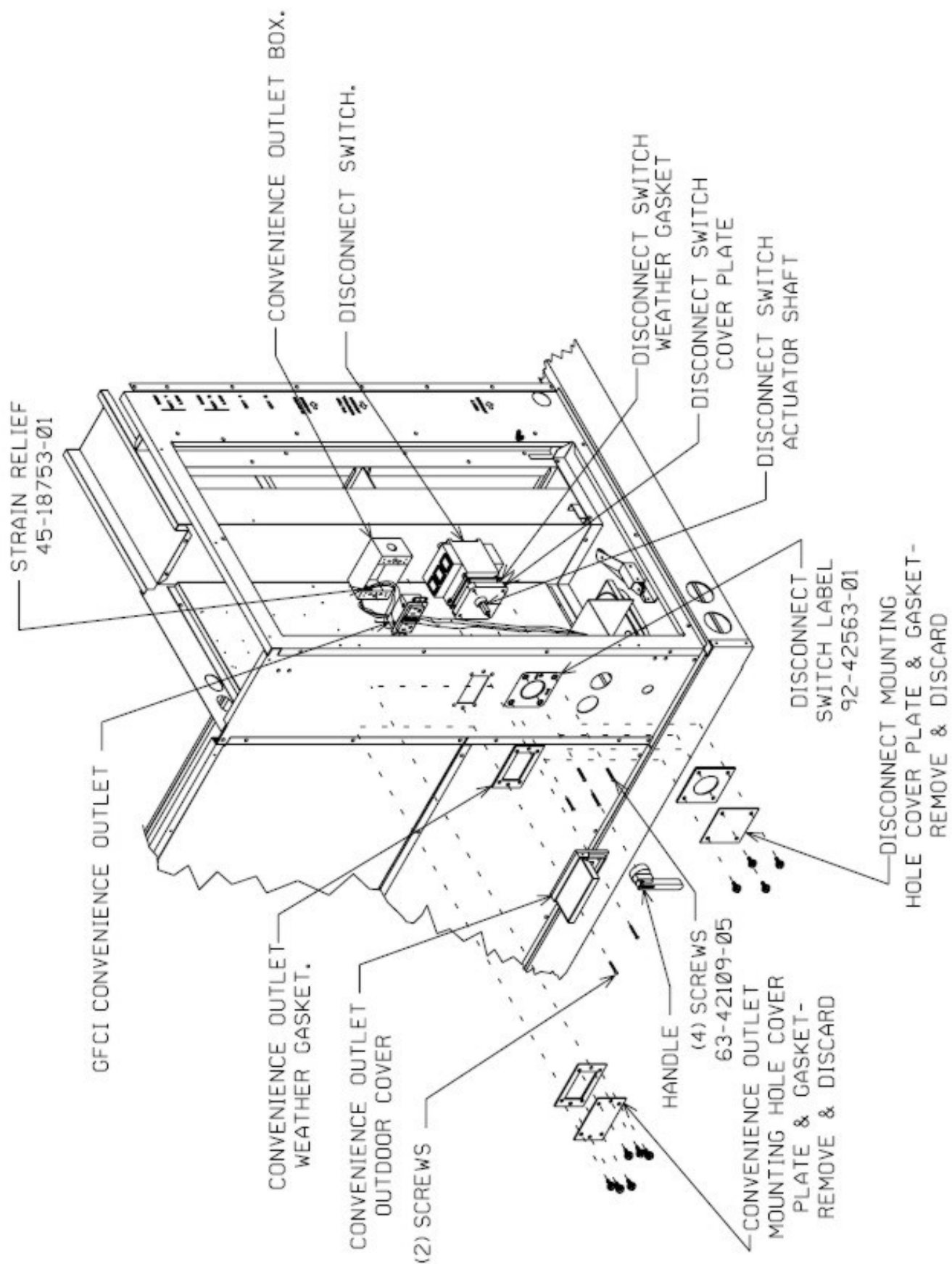


DANGER

Electrical shock hazard. Can cause property damage, personal injury or death. Before beginning any modification, be sure the main disconnect switch is in the "Off" position and tagged with a suitable warning label.

Procedure (also see diagram next page)

1. Connect the three wires to the receptacle.
2. Remove the convenience outlet mounting hole cover plate (with gasket) and discard.
3. Use two setscrews to attach the convenience outlet outdoor cover, gasket, GFCI convenience outlet with wires, and convenience outlet box.
4. Connect the three wires to an external 110 V power source.



CONVERSION KIT INDEX NATURAL GAS TO PROPANE GAS, CANADIAN HIGH ALTITUDE, AND MAIN BURNER ORIFICE CHART (-)RNL/(-)RPL/(-)KNL/(-)KPL/(-)RKA/(-)RMA/(-)RNA/(-)KKA/(-)KMA/(-)QPW (-)KNA/(-)KKB/(-)KMB/(-)KNB ROOFTOP UNITS (50 AND 60Hz MODELS)

▲ Recognize this symbol as an indication of Important Safety Information!

▲ WARNING

FURNACES USED ON LP GAS MUST BE EQUIPPED WITH 100% SAFETY SHUT-OFF CONTROLS. CONVERSION WITH THE CORRECT KIT WILL MEET THIS SAFETY REQUIREMENT. CONVERSION WITH THE WRONG KIT CAN LEAD TO A FIRE OR EXPLOSION RESULTING IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

The conversion of Air Conditioning Division furnaces must be made by a qualified service professional using factory specified or approved parts. The following conversion kits must only be used on the furnace models and gas control systems for which they are shown. If you do not find your exact furnace model number in the kit selection chart, contact your distributor or manufacturer for help in verifying the correct kit selection for your equipment. **Do not substitute** kits or kit components in order to avoid risk of dangerous conditions that may result in personal injury or property damage.

IMPORTANT NOTE FOR INSTALLATIONS AT ELEVATIONS ABOVE 2,000 FEET (610 METERS): The main burner orifices in your furnace and in Natural Gas to LP Gas (Propane) Conversion Kits are sized for the nameplate input and intended for installations at elevations up to 2,000 feet only. For elevations above 2,000 feet (610 meters), the burner orifices must be sized to reduce the input as follows:

In the USA: Reduce the input 4% for each 1,000 feet (305 meters) above sea level.

See Chart III in this Conversion Kit Index for proper orifice sizes for the elevation at which the specific unit is to be installed. The Conversion Kit Index is shipped with each unit and with the Natural Gas to LP Gas (Propane) Conversion Kits.

In Canada: A high altitude conversion kit available from the manufacturer must be used for operation on natural gas at elevations of 2,000 - 4,500 feet (610 - 1373 meters) above sea level. See Chart II in this Conversion Kit Index for the Canadian High Altitude Kit model number.

The proper high altitude orifices and instructions are included with the standard Natural Gas to LP Gas (Propane) Conversion Kits for operation on LP Gas (Propane) at elevations of 2,000 - 4,500 feet (610 - 1373 meters) above sea level in Canada. A special high altitude kit is not required in this case. Simply use the proper orifice size specified in Chart III in this Conversion Kit Index for elevations of 2,000 - 4,500 feet (610 - 1373 meters) in Canada.

NOTICE: THE CONVERSION SHALL BE CARRIED OUT BY A MANUFACTURER'S AUTHORIZED REPRESENTATIVE, IN ACCORDANCE WITH THE REQUIREMENTS OF THE MANUFACTURER, AND STATE, PROVINCIAL, OR TERRITORIAL AUTHORITIES HAVING JURISDICTION AND IN ACCORDANCE WITH THE REQUIREMENTS OF ALL LOCAL CODES, THE NATIONAL FUEL GAS CODE, ANSI Z223.1, CAN/CGA-B149.1, OR CAN/CGA-B149.2 INSTALLATION CODES.

HOW TO IDENTIFY THE CONTROL SYSTEM ON THE FURNACE TO BE CONVERTED

The model number and the first two letters of the serial number on the furnace to be converted are required to select the proper conversion kit. This information is located on the rating plate of the furnace. The first two characters of the serial number designate the control system as applied by the manufacturer and the type gas it was manufactured to burn.

STEP 1. Locate the first two letters of the serial number in Chart I. This is the control system on the furnace. All furnaces are manufactured to burn natural gas.

STEP 2. Determine the altitude at which the furnace is to be installed.

EXAMPLE

Serial number on furnace rating plate: 1AD1234AAAAF12340001



The first two characters in the serial number are “1A.” When the “1A” is located in Chart I, the control system in the furnace is a Honeywell VR8205 gas valve with United Tech. 1016-452 direct spark ignition control, manufactured to burn natural gas.

With the model number from the rating plate, the control system from Chart I, and the type gas it presently burns, the proper conversion kit can now be selected.

CHART I CONTROL SYSTEMS

- 1A = HONEYWELL VR8205M GAS VALVE WITH UNITED TECH. 1016-452 DIRECT SPARK IGNITION CONTROL
- 1B = HONEYWELL VR8205M GAS VALVE WITH FENWALL 05-29DSI DIRECT SPARK IGNITION CONTROL
- 1C = HONEYWELL VR8205M GAS VALVE WITH JOHNSON CONTROLS G766BCA DIRECT SPARK IGNITION CONTROL
- 1D = WHITE RODGERS 36E36 GAS VALVE WITH UNITED TECH. 1016-452 DIRECT SPARK IGNITION CONTROL
- 1E = WHITE RODGERS 36E36 GAS VALVE WITH FENWALL 05-29DSI DIRECT SPARK IGNITION CONTROL
- 1F = WHITE RODGERS 36E36 GAS VALVE WITH JOHNSON CONTROLS G766BCA DIRECT SPARK IGNITION CONTROL
- 1G = ROBERTSHAW 7200DER GAS VALVE WITH UNITED TECH. 1016-452 DIRECT SPARK IGNITION CONTROL
- 1H = ROBERTSHAW 7200DER GAS VALVE WITH FENWALL 05-29DSI DIRECT SPARK IGNITION CONTROL
- 1J = ROBERTSHAW 7200DER GAS VALVE WITH JOHNSON CONTROLS G766BCA DIRECT SPARK IGNITION CONTROL
- 1K = WHITE RODGERS 36E96 GAS VALVE WITH UNITED TECH. 1016-452 DIRECT SPARK IGNITION CONTROL
- 1L = WHITE RODGERS 36E96 GAS VALVE WITH FENWALL 05-29DSI DIRECT SPARK IGNITION CONTROL
- 1M = WHITE RODGERS 36E96 GAS VALVE WITH JOHNSON CONTROLS G766BCA DIRECT SPARK IGNITION CONTROL
- 1N = ROBERTSHAW 7200DER2-5 GAS VALVE WITH UNITED TECH. 1016-452 DIRECT SPARK IGNITION CONTROL
- 1P = ROBERTSHAW 7200DER2-5 GAS VALVE WITH FENWALL 05-29DSI DIRECT SPARK IGNITION CONTROL
- 1Q = ROBERTSHAW 7200DER2-5 GAS VALVE WITH JOHNSON CONTROLS G766BCA DIRECT SPARK IGNITION CONTROL
- 1R = HONEYWELL VR8205 WITH UNITED TECH. 1068-300 OR 1068-301 INTEGRATED FURNACE CONTROL
- 1S = WHITE RODGERS 36-36 WITH UNITED TECH. 1068-300 OR 1068-301 INTEGRATED FURNACE CONTROL
- 1T = WHITE RODGERS 36E37 WITH UNITED TECH. 1016-452 DIRECT SPARK
- 1U = WHITE RODGERS 36E37 WITH JOHNSON CONTROLS G766BCA DIRECT SPARK
- 1V = HONEYWELL VR8205H WITH UNITED TECH. 1016-452 DIRECT SPARK
- 1W = HONEYWELL VR8205H WITH JOHNSON CONTROLS G7766BCA DIRECT SPARK
- 1X = WHITE RODGERS 36E37 WITH UNITED TECH. 1068-300 OR 1068-301 INTEGRATED FURNACE CONTROL
- 1Y = HONEYWELL VR8205H WITH UNITED TECH. 1068-300 OR 1068-301 INTEGRATED FURNACE CONTROL
- 1Z = WHITE RODGERS FAST OPEN (36C76) WITH UNITED TECHNOLOGIES 1068-210 INTEGRATED FURNACE CONTROL
- 2A = WHITE RODGERS SLOW OPEN (36E23) WITH UNITED TECHNOLOGIES 1068-300 OR 1068-301 INTEGRATED FURNACE CONTROL
- 2B = WHITE RODGERS SNAP OPEN (36E99) WITH UNITED TECHNOLOGIES 1068-210 INTEGRATED FURNACE CONTROL
- 2C = WHITE RODGERS SNAP OPEN (36E99) WITH UNITED TECHNOLOGIES 1068-300 INTEGRATED FURNACE CONTROL
- 2D = HONEYWELL SNAP OPEN (VR8305Q) WITH UNITED TECHNOLOGIES 1068-210 INTEGRATED FURNACE CONTROL
- 2E = WHITE RODGERS SLOW OPEN (36F23) WITH UNITED TECHNOLOGIES 1068-300 OR 1068-301 INTEGRATED FURNACE CONTROL
- 2F = WHITE-RODGERS SNAP OPEN (36E55) AND UNITED TECHNOLOGIES INTEGRATED FURNACE CONTROL (1068-300)
- 2G = HONEYWELL SLOW OPEN (VR8205S) AND UNITED TECHNOLOGIES INTEGRATED FURNACE CONTROL (1068-300/301)
- 2H = WHITE-RODGERS SNAP OPEN (36E55) AND UNITED TECHNOLOGIES INTEGRATED FURNACE CONTROL (1068-210)

USING CONVERSION KIT CHART II

- STEP 1) Find the appropriate control system by serial number code letters in line 2 of Chart II.
- STEP 2) Verify the control system listed in line 3 of Chart II by name. Also verify that the furnace actually has this type control system.
- STEP 3) Identify the furnace model number in lines 4 or 5 in Chart II and move across this line until it intersects the proper serial number column found in step 1. This space shows the proper conversion kit model number.

EXAMPLE

You wish to convert a Rooftop natural gas furnace model (-)RKA from Natural Gas to Propane Gas. Using the information from the first example, the first two letters of the serial number were "1A." From Chart I the "1A" signifies this furnace was manufactured with a Honeywell VR8205 gas valve with United Technologies direct spark ignition control. Locate the serial number coded letters "1A" in line 2 of Chart II and then look below this space to verify the type control system by name as shown on line 3 (Honeywell VR8205 gas valve with direct spark ignition). Then verify that the furnace actually has this type control system. Locate the model number of the unit in lines 4 and 5 of the first column. Then move across this line until it intersects the column under the proper serial number code. The proper conversion kit model number is RXGJ-EP85H.

CHART II
CONVERSION KITS - NATURAL GAS TO PROPANE GAS

1	TYPE KIT, ALTITUDE AND COUNTRY	NAT. GAS TO PROPANE ALL ALTITUDES - (USA & CANADA)	NAT. GAS TO PROPANE ALL ALTITUDES - (USA & CANADA)	NAT. GAS TO PROPANE ALL ALTITUDES - (USA & CANADA)	NAT. GAS TO PROPANE ALL ALTITUDES - (USA & CANADA)	NAT. GAS TO PROPANE ALL ALTITUDES - (USA & CANADA)	NAT. GAS TO NAT. GAS 2,000-4,500 FT. (610-1373M) (CANADA ONLY)
2	SERIAL NO. CODE LETTER	1A, 1B, 1C, 1R, 1V, 1W, 1Y or 2G	1D, 1E, 1F, 1S, 1T, 1U, 1X, 2A or 2E	1K, 1L, 1M, 2B, 2C, 2F OR 2H	1Z	2D	ALL
3	TYPE CONTROL SYSTEM	HONEYWELL VR8205 GAS VALVE WITH DIRECT SPARK IGNITION	WHITE RODGERS 36E23, 36E36, 36F23 OR 36E37 GAS VALVE WITH DIRECT SPARK IGNITION	WHITE RODGERS 36E55, 36E96 OR 36E99 GAS VALVE WITH DIRECT SPARK IGNITION	WHITE RODGERS 36C76 GAS VALVE WITH DIRECT SPARK IGNITION	HONEYWELL VR8305Q GAS VALVE WITH DIRECT SPARK IGNITION	ALL
4	<u>KIT NUMBER FOR FURNACE MODELS:</u> ALL RRKA MODELS ALL RRMA MODELS ALL RRNA MODELS ALL RRNL MODELS ALL RRPL MODELS ALL RQPW MODELS ALL SINGLE STAGE RKKA MODELS ALL SINGLE STAGE RKMA MODELS ALL RKNA MODELS ALL RKNL MODELS ALL RKPL MODELS	USE KIT NO. RXGJ-EP85H	USE KIT NO. RXGJ-EP84W				USE KIT NO. RXRX-AH01
5	<u>KIT NUMBER FOR FURNACE MODELS:</u> TWO STAGE RKKB/RKKA/RKMB/RKMA MODELS			USE KIT NO. RXGJ-EP86W	USE KIT NO. RXGJ-EP87W	USE KIT NO. RXGJ-FP14	USE KIT NO. RXRX-AH02

USING CONVERSION KIT CHART III

The following chart should be used to verify the size of all main burner orifices for high altitude derating and natural gas to propane gas conversions.

Use the furnace nameplate gas **INPUT** rating, the number of main burners and the altitude of the installation to select the correct natural gas or propane gas orifice size.

The table is based on manifold pressures of 3.5" W.C. for natural gas and 10" W.C. for propane gas.

IMPORTANT: NEVER ATTEMPT TO INCREASE THE GAS FURNACE FIRING RATE BY USING LARGER ORIFICES THAN SPECIFIED. ALTHOUGH FURNACE DIMENSIONS MAY APPEAR SIMILAR, INTERNAL DIFFERENCES CAN CAUSE POOR COMBUSTION, UNSAFE OPERATING CONDITIONS, AND PREMATURE EQUIPMENT FAILURE.

**CHART III
MAIN BURNER ORIFICE SIZES**

TOTAL FURNACE RATING PLATE INPUT (BTU/HR)	CANADIAN HIGH ALTITUDE DERATED INPUT (BTU/HR)	NUMBER OF BURNERS	NATURAL GAS					PROPANE GAS				
			HEATING VALUE 1075 BUT/CU. FT.					HEATING VALUE 2500 BTU/CU. FT.				
			SPECIFIC GRAVITY 0.65/MANIFOLD PRESSURE @ 3.5" W.C.					SPECIFIC GRAVITY 1.53/MANIFOLD PRESSURE @ 10.0" W.C.				
			ELEVATION 0 - 2000' (USA/ CANADA)	ELEVATION 4000' (USA ONLY)	ELEVATION 6000' (USA ONLY)	ELEVATION 8000' (USA ONLY)	ELEVATION 2000 - 4500' (CANADA)	ELEVATION 0 - 2000' (USA/ CANADA)	ELEVATION 4000' (USA ONLY)	ELEVATION 6000' (USA ONLY)	ELEVATION 8000' (USA ONLY)	ELEVATION 2000 - 4500' (CANADA)
40,000	36,000	2	45	47	48	49	5/64	55	55	56	56	3/64
60,000	54,000	3	45	47	48	49	5/64	55	55	56	56	3/64
72,000 (50 Hz Model)	N/A	4	5/64	49	50	51	N/A	3/64	57	57	59	N/A
80,000	72,000	4	45	47	48	49	5/64	55	55	56	56	3/64
90,000 (50 Hz Model)	N/A	5	5/64	49	50	51	N/A	3/64	57	57	59	N/A
100,000	90,000	5	45	47	48	49	5/64	55	55	56	56	3/64
120,000 (50 and 60 Hz)	108,000	6	45	47	48	49	5/64	55	55	56	56	3/64
135,000	121,500	6	44	45	47	48	45	54	55	55	56	55
150,000	135,000	6	42	43	44	45	44	54	55	55	56	54
180,000 (50 Hz Model)	N/A	9	45	47	48	49	N/A	55	55	56	56	N/A
210,000 (50 Hz Model)	N/A	9	43	44	45	47	N/A	54	55	55	56	N/A
210,000 (50 Hz Model)	N/A	10	45	47	48	49	N/A	55	55	56	56	N/A
225,000	202,500	9	42	43	44	45	44	54	55	55	56	54
250,000	225,000	10	42	43	44	45	44	54	55	55	56	54
252,000	225,000	9	40	42	43	44	42	53	54	54	55	54
252,000 (50 Hz Model)	N/A	12	45	47	48	49	N/A	55	55	56	56	N/A
290,000 (50 Hz Model)	N/A	14	45	47	48	49	N/A	55	55	56	56	N/A
300,000	270,000	12	42	43	44	45	44	54	55	55	56	54
330,000 (50 Hz Model)	N/A	14	43	44	45	47	N/A	54	55	55	56	N/A
350,000	315,000	14	42	43	44	45	44	54	55	55	56	54
400,000	360,000	14	40	42	43	44	42	53	54	54	55	54

N/A = Not Applicable

INSTALLATION INSTRUCTIONS FOR POWER EXHAUST MODELS RXRX-BFF02*

▲ Recognize this symbol as an indication of Important Safety Information!

▲ WARNING

THE INSTALLATION SHALL BE CARRIED OUT BY A MANUFACTURER'S AUTHORIZED REPRESENTATIVE, IN ACCORDANCE WITH THE REQUIREMENTS OF THE MANUFACTURER. FAILURE TO FOLLOW INSTRUCTIONS CAN RESULT IN FIRE OR EXPLOSION CAUSING PROPERTY DAMAGE, SEVERE PERSONAL INJURY OR DEATH. THE QUALIFIED SERVICE PERSONNEL PERFORMING THIS WORK ASSUMES RESPONSIBILITY FOR THIS INSTALLATION.

NOTICE: DAMAGE TO THE PRODUCT RESULTING FROM FAILURE TO FOLLOW INSTRUCTIONS OR USE OF UNAUTHORIZED PARTS MAY BE EXCLUDED FROM THE MANUFACTURER'S PRODUCT WARRANTY COVERAGE.

▲ WARNING

TURN OFF ELECTRICAL POWER AND TURN OFF MAIN GAS SUPPLY BEFORE BEGINNING MODIFICATION. FAILURE TO SO CAN CAUSE ELECTRICAL SHOCK, EXPLOSION OR FIRE RESULTING IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

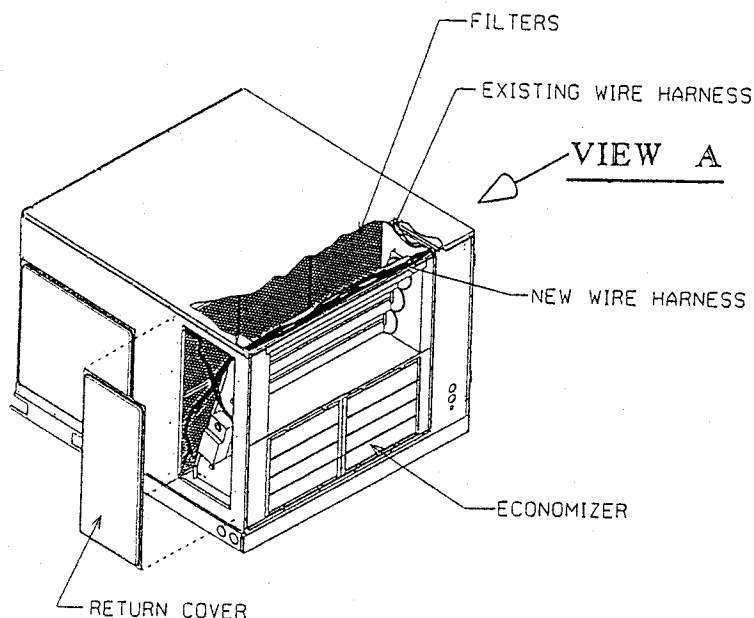


FIGURE 1

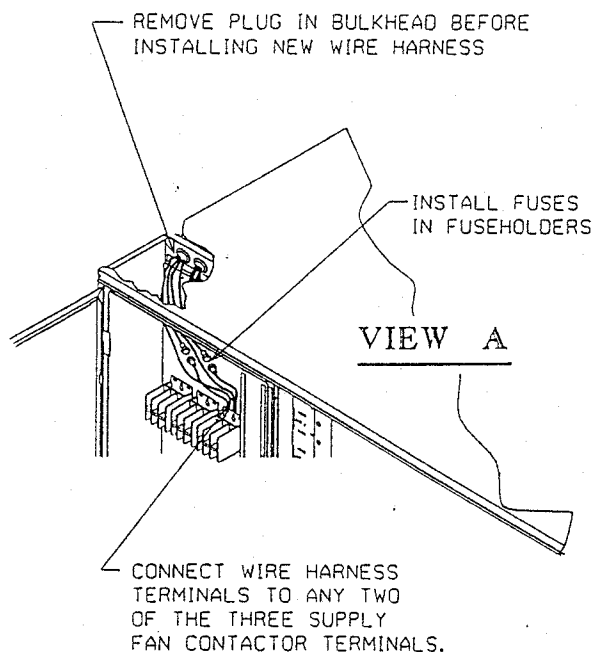


FIGURE 2

INSTALLATION

1. REMOVE RETURN COVER. (See Fig. 1)
2. CONNECT NEW WIRE HARNESS IN CONTROL BOX BACK (VIEW A) AND ROUTE ABOVE ECONOMIZER. (See Fig. 2)

3. REMOVE RELIEF DAMPERS FROM ECONOMIZER. (See Fig. 3)

4. CONNECT POWER EXHAUST WIRING:

PLUG IN CONTROL CONNECTIONS FROM POWER EXHAUSTS TO EXISTING CONNECTIONS PROVIDED ON ECONOMIZER.

REMOVE SMALL RECTANGULAR COVER BESIDE CONTROL CONNECTIONS ON ECONOMIZER AND DISCARD. (FIG. 2).

USE SCREW THAT WAS REMOVED IN PREVIOUS STEP TO ATTACH GROUND TERMINALS ON WIRE HARNESS.

PLUG IN POWER CONNECTIONS THROUGH THE RECTANGULAR HOLES REVEALED WHEN THE COVER WAS REMOVED.

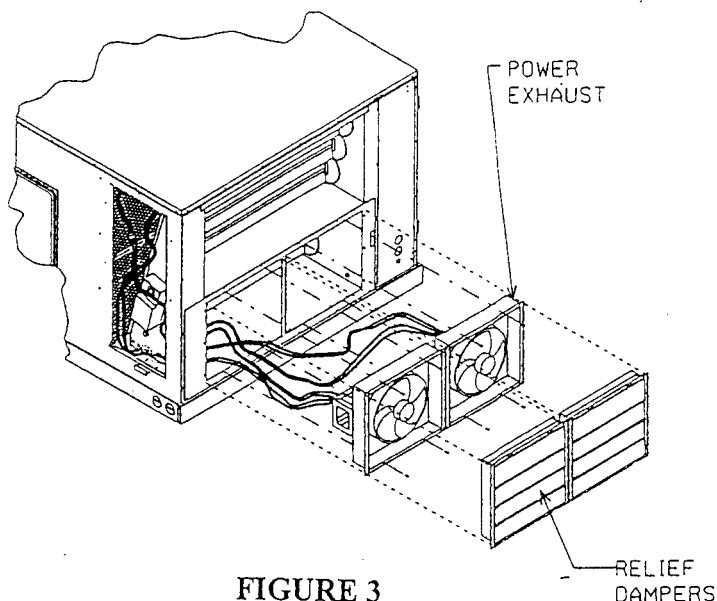


FIGURE 3

5. ROUTE POWER AND CONTROL CONNECTIONS UNDER DIVIDER PANEL USING LINE CLAMPS PROVIDED TO TAKE UP EXCESS SLACK IN WIRING HARNESS AND AVOID CONTACT BETWEEN FAN BLADES AND WIRING HARNESS DURING OPERATION (FIG. 4). SECURE EACH POWER EXHAUST WITH (4) SCREWS (2 IN TOP FLANGE AND 2 IN BOTTOM FLANGE).

6. CONNECT ENDS OF NEW WIRE HARNESS TO POWER CONNECTIONS. (SEE FIG.4)

7. REINSTALL RELIEF DAMPERS.

8. REINSTALL RETURN COVER.

9. ALL UNITS ARE FACTORY SHIPPED FOR HIGH SPEED. FOR CHANGING TO LOW SPEED, SEE NOTES SECTION ON WIRING DIAGRAM.

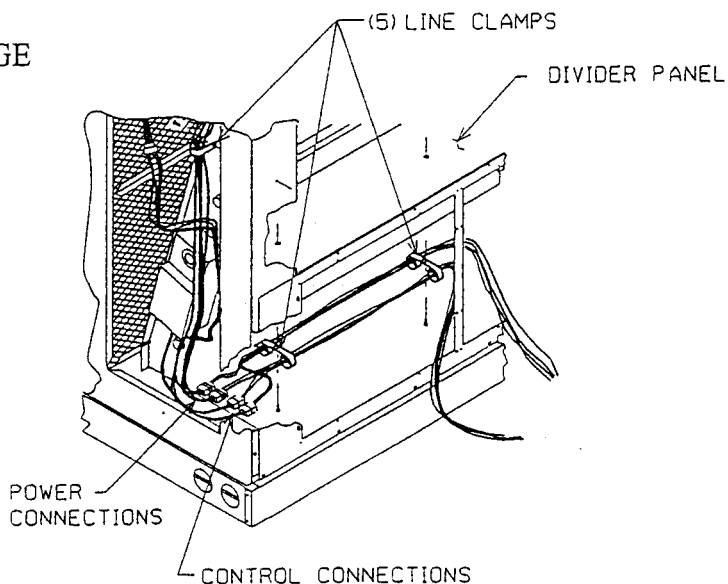
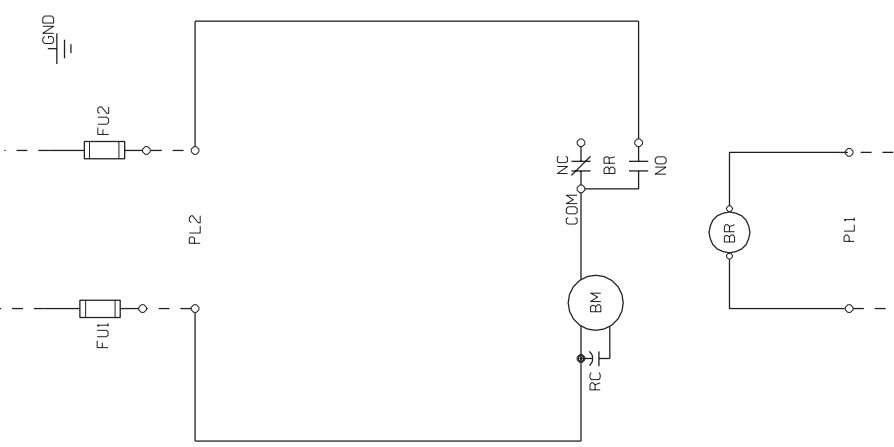
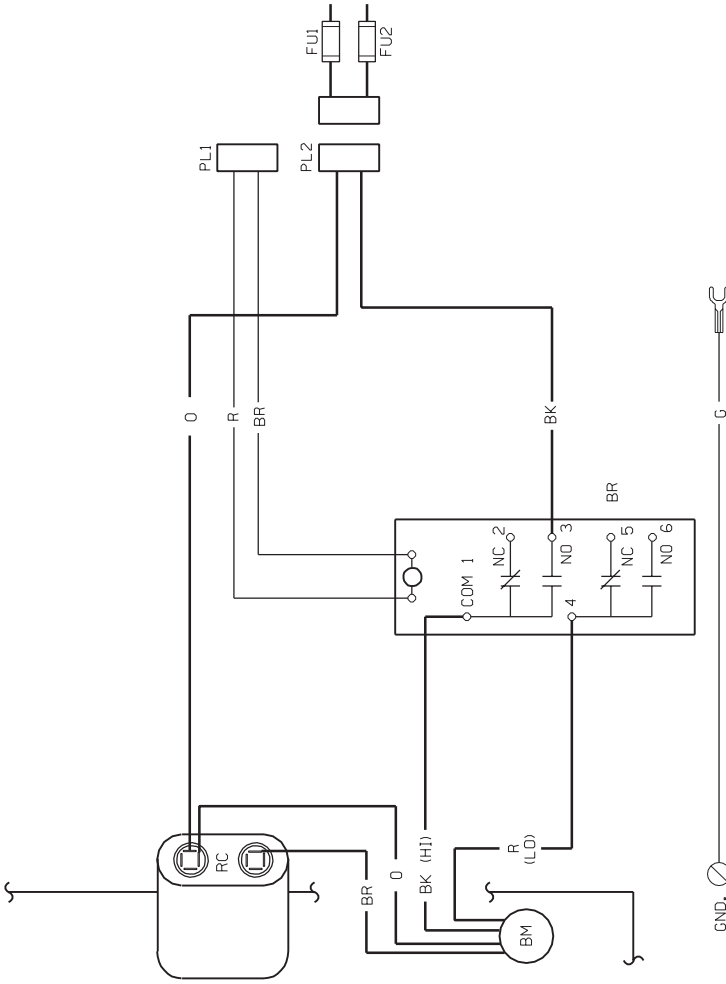


FIGURE 4



COMPONENT CODE

BR BLOWER RELAY
GND GROUND
BM BLOWER MOTOR
RC RUN CAPACITOR
PL PLUG
FU FUSE

NOTES:

1. CONNECT SUPPLY WIRING FOR VOLTAGE, PHASE AND HERTZ SHOWN ON UNIT RATING PLATE.
2. SUPPLY WIRE MUST BE RATED AT 75° C MIN. SEE INSTRUCTIONS FOR SIZE.
3. FOR USE WITH COPPER CONDUCTORS ONLY.
4. UNIT FACTORY WIRE FOR HIGH SPEED - REVERSE TERMINALS 1 AND 4 ON RELAY FOR LOW SPEED OPERATION.
5. PLUGS 1 AND 2 CONNECT TO ECONOMIZER.
6. USE 8 AMP TYPE KTK-R (13/32x1 1/2) 600V FUSE.

WIRING INFORMATION

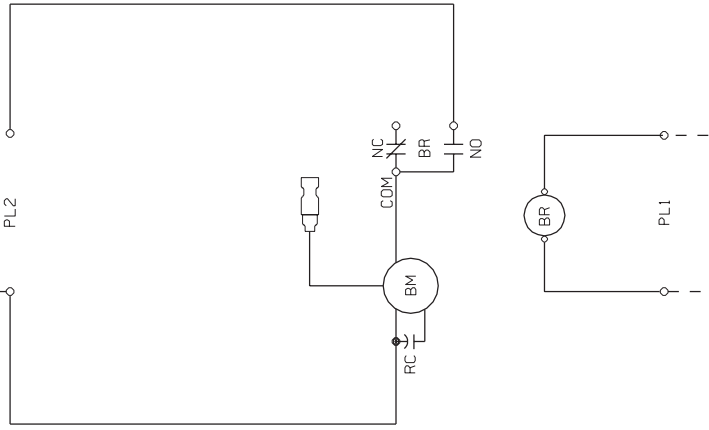
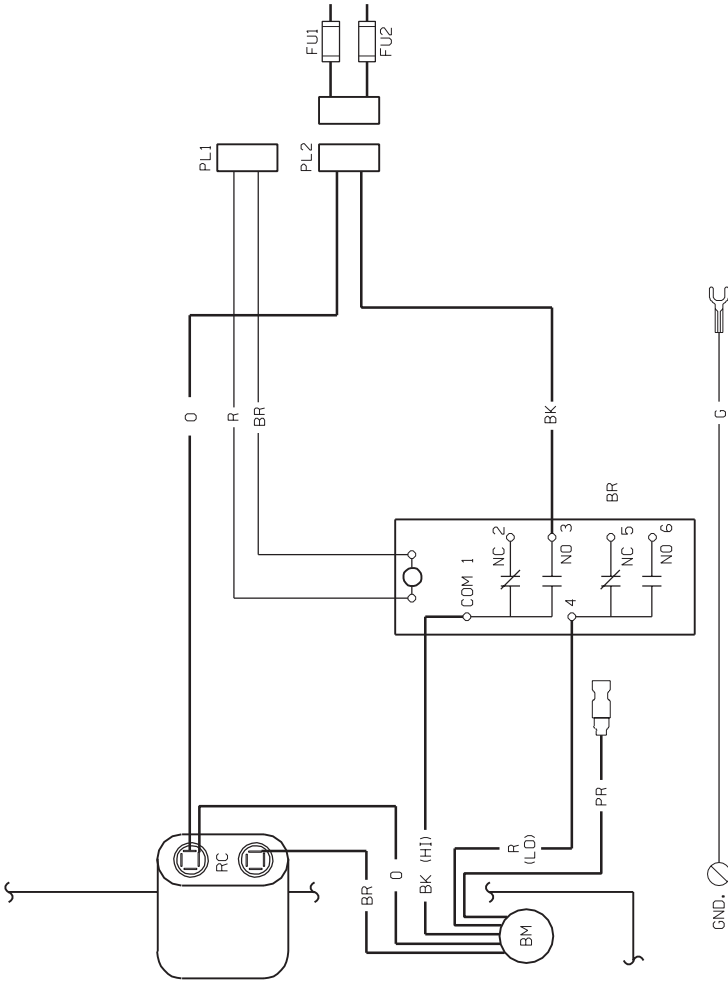
LINE VOLTAGE
-FACTORY STANDARD
-FACTORY OPTION
-FIELD INSTALLED
LOW VOLTAGE
-FACTORY STANDARD
-FACTORY OPTION
-FIELD INSTALLED
REPLACEMENT WIRE
-MUST BE THE SAME SIZE AND TYPE OF INSULATION AS ORIGINAL (105° C MIN.)
WARNING
-CABINET MUST BE PERMANENTLY GROUNDED AND CONFORM TO I.E.C., N.E.C., C.E.C. AND LOCAL CODES AS APPLICABLE.

WIRE COLOR CODE

BK___BLACK
BR___BROWN
BL___BLUE
G___GREEN
GY___GRAY
O___ORANGE
PR___PURPLE
R___RED
W___WHITE
Y___YELLOW

WIRING DIAGRAM

POWER EXHAUST
208-230 VOLT,
AND 460 VOLT



COMPONENT CODE

BR BLOWER RELAY
GND GROUND
BM BLOWER MOTOR
RC RUN CAPACITOR
PL PLUG
FU FUSE

NOTES:

1. CONNECT SUPPLY WIRING FOR VOLTAGE, PHASE AND HERTZ SHOWN ON UNIT RATING PLATE.
2. SUPPLY WIRE MUST BE RATED AT 75° C MIN. SEE INSTRUCTIONS FOR SIZE.
3. FOR USE WITH COPPER CONDUCTORS ONLY.
4. UNIT FACTORY WIRED FOR HIGH SPEED. REMOVE BLACK WIRE FROM TERMINAL 1. CONNECT RED WIRE TO TERMINAL 1 AND CONNECT PURPLE WIRE TO BLACK WIRE.
5. PLUGS 1 AND 2 CONNECT TO ECONOMIZER.
6. USE 8 AMP TYPE KTK-R (3/32x1 1/2) 600V FUSE.

WIRING INFORMATION

LINE VOLTAGE
-FACTORY STANDARD
-FACTORY OPTION
-FIELD INSTALLED
LOW VOLTAGE
-FACTORY STANDARD
-FACTORY OPTION
-FIELD INSTALLED
REPLACEMENT WIRE
-MUST BE THE SAME SIZE AND TYPE OF INSULATION AS ORIGINAL (105° C MIN.)
WARNING
-CABINET MUST BE PERMANENTLY GROUND AND CONFORM TO I.E.C., REQUIREMENTS

WIRE COLOR CODE

BK___BLACK
BR___BROWN
BL___BLUE
G___GREEN
GY___GRAY
O___ORANGE
PR___PURPLE
R___RED
W___WHITE
Y___YELLOW

WIRING DIAGRAM

POWER EXHAUST
575 VOLT

INSTALLATION INSTRUCTIONS

MODELS RXRX-BGF03 & RXRX-BGF04

ECONOMIZER POWER EXHAUST

⚠ WARNING

This installation shall be carried out by a manufacturer's authorized representative, in accordance with the requirements of the manufacturer. Failure to follow instructions can result in fire or explosion, causing property damage, severe personal injury, or death. The qualified service personnel performing this work assumes responsibility for this installation.

IMPORTANT

Damage to the product, resulting from failure to follow instructions or use of unauthorized parts, may be excluded from the manufacturer's product warranty coverage.

⚠ WARNING

Turn off electrical power and turn off main gas supply before beginning modification. Failure to do so can cause electrical shock, explosion, or fire, resulting in property damage, personal injury, or death.

TOOLS REQUIRED FOR INSTALLATION:

$\frac{3}{8}$ " electric drill with $\frac{5}{16}$ " socket

$\frac{1}{8}$ " diameter drill bit for sheet metal.

PACKAGE CONTENTS		RXRX-BGF03 Power Exhaust C, D, Y Voltage	RXRX-BGF04 Power Exhaust C, D, Y Voltage
ITEM	DESCRIPTION	PART No.	PART No.
1	Power Exhaust Assembly	6046520 / PEA	6046508 / PEA
2	Fan Blade	6046520 / 3464	6046508 / 3464
3	Fan Motor 208-230 volt / 1 phase (C)	6046520 / 3675	6046508 / 3675
4	Fan Motor 208-230 volt / 1 phase (D)	6046520 / 3675	6046508 / 3675
5	Fan Motor 208-230 volt / 1 phase (Y)	6046520 / 3698	6046508 / 3968
6	Relay (R1)	6046520 / 3400	6046508 / 3400
7	Fuse Block	6046520 / 3370	6046508 / 3370
8	Barometric Relief Adaptor	6046520 / ADP	6046508 / ADP

Step 1:

Remove lower barometric relief hood. Remove relief damper section from economizer or duct work.

Step 2:

Place relief damper section onto barometric relief damper adapter and secure with screws provided with power exhaust.

Step 3:

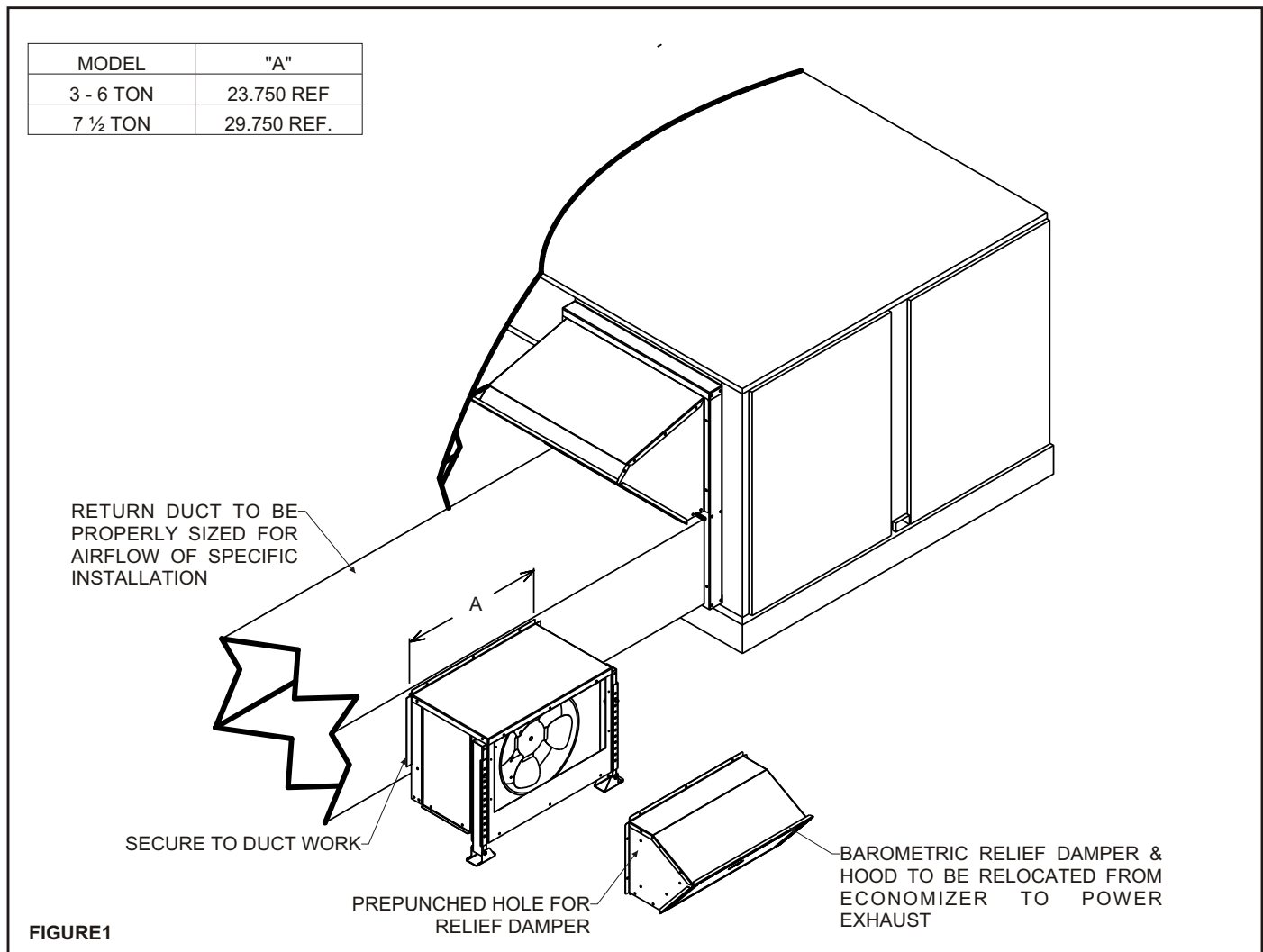
Place relief damper assembly into lower hood assembly where prepunched holes are in hood sides with screws from **Step 1**.

Horizontal Application:**Step 4:**

Place power exhaust over hole in duct work and secure to duct work. Adjust support legs to level power exhaust. **See Figure 1.**

Vertical Application:**Step 5:**

Place over hole where hood was located and secure. **See Figure 2.**



NOTE:
COIL NOT SHOWN
FOR CLARITY

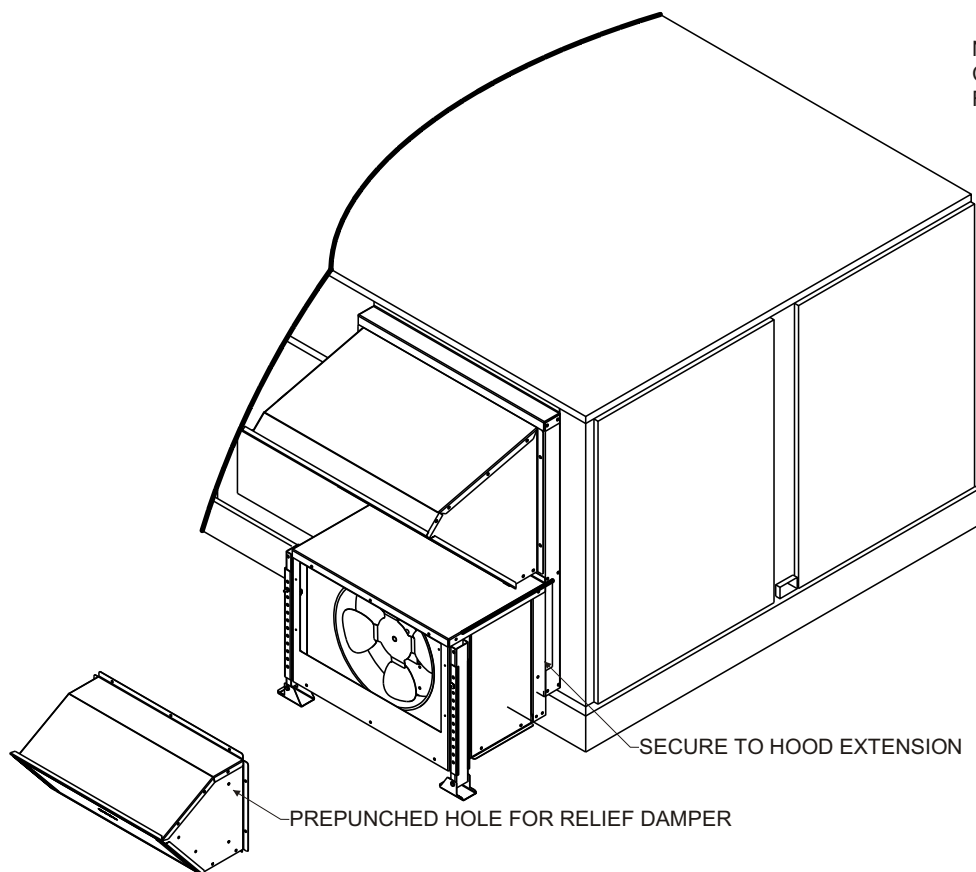
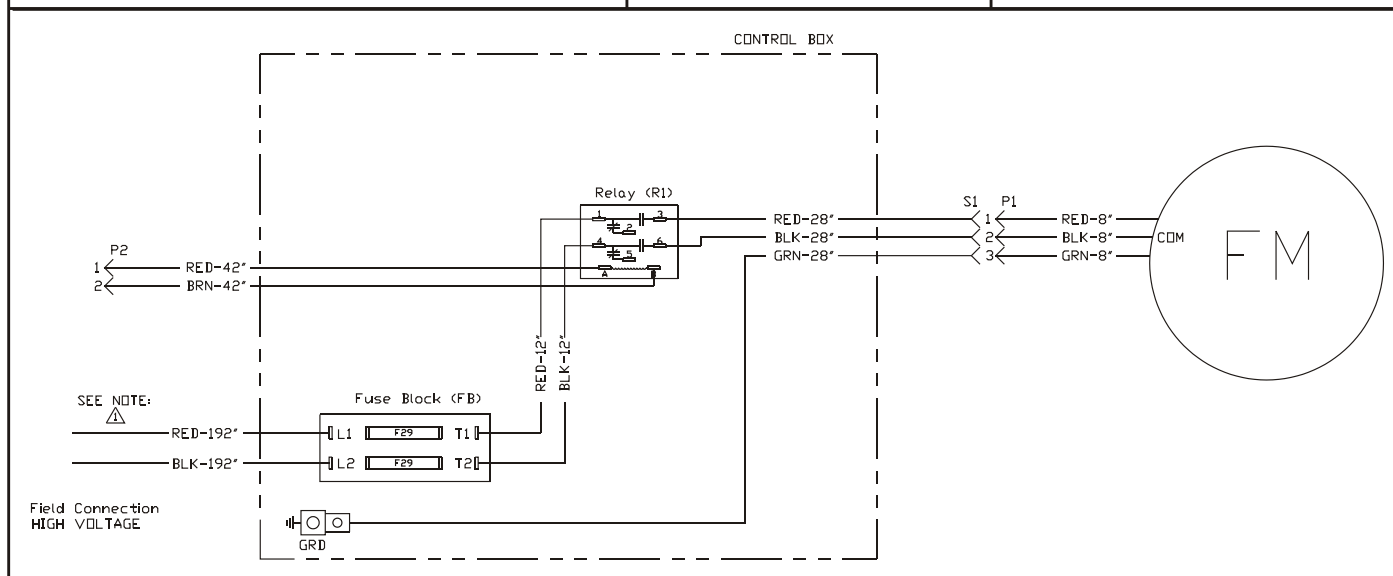


FIGURE 2

HARNESS DETAIL	COMPONENT CODE	WIRE COLOR CODE			
		BLK	Black	BLU	Blue
		BRN	Brown	GRN	Green
		GRY	Gray	ORG	Orange
		RED	Red	VIO	Violet
		YEL	Yellow		



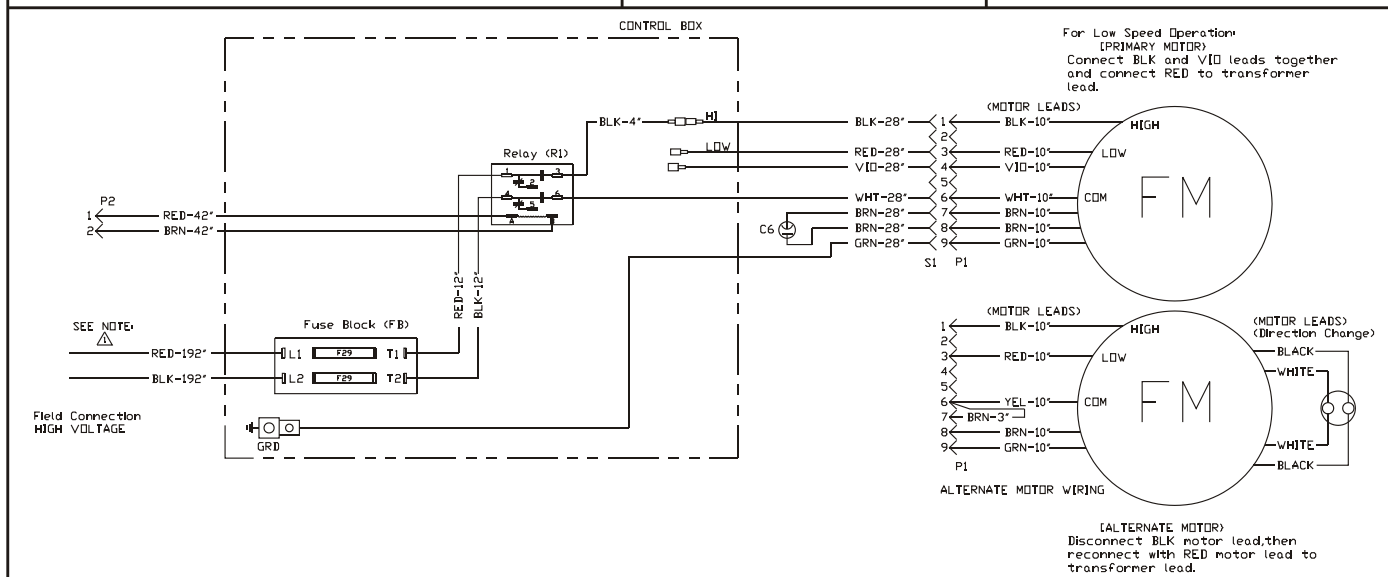
Notes:

230 Volt 1-Phase Power Exhaust for
RXRX-BGF03C / RXRX-BGF04C
RKKA / JKA / LKA-MA 036-090

Rooftop Systems, Inc.
2405 McIver Lane
Carrollton, Texas 75006
Phone (972) 247-7447
Fax (972) 243-0940

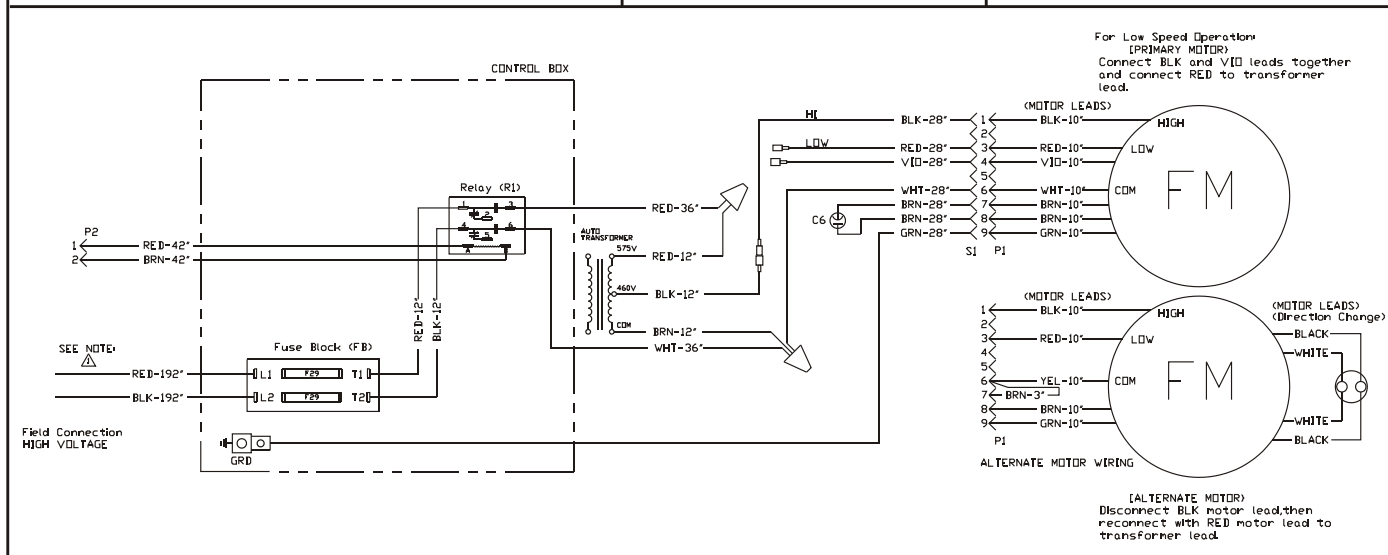
Date: May 17, 2006
Supercedes:
Drawn by:
Unit # 60-465-20/08-21
Diagram# 4652021w

HARNESS DETAIL	COMPONENT CODE	WIRE COLOR CODE
		BLK Black BLU Blue BRN Brown GRN Green GRY Gray ORG Orange RED Red VIO Violet WHT White YEL Yellow



Notes:	460 Volt 1-Phase Power Exhaust for RXRX-BGF03D / RXRX-BGF04D RKKA / JKA / LKA-MA 036-090	
	Rooftop Systems, Inc. 2405 McIver Lane Carrollton, Texas 75006 Phone (972) 247-7447 Fax (972) 243-0940	Date: May 23, 2006 Supersedes: 05-17-06 Drawn by: Unit # 60-465-20/08-31 Diagram# 4652031w

HARNESS DETAIL	COMPONENT CODE	WIRE COLOR CODE
		BLK Black BLU Blue BRN Brown GRN Green GRY Gray ORG Orange RED Red VIO Violet WHT White YEL Yellow



Notes:	575 Volt 1-Phase Power Exhaust for RXRX-BGF03Y / RXRX-BGF04Y RKKA / JKA / LKA-MA 036-090	
	Rooftop Systems, Inc. 2405 McIver Lane Carrollton, Texas 75006 Phone (972) 247-7447 Fax (972) 243-0940	Date: May 23, 2006 Supersedes: 05-17-06 Drawn by: Unit # 60-465-20/08-41 Diagram# 4652041w

SUPERCEDES 05-17-06
MAY 24, 2006

RMPE20

INSTALLATION INSTRUCTIONS

MODEL# (-)XKG SERIES

ROOF CURBS

This Roof Curb is built to NRCA specifications and is constructed of 18 gauge galvanized steel with a full perimeter 1" X 4" wood nailer strip. Curb height is determined by the part number as listed below.

(-)XKG-CAD14 = 14 inches high
 (-)XKG-CAD24 = 24 inches high

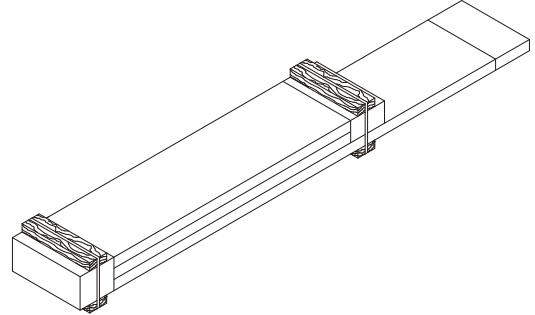


Figure 1

Step 1:
 Check for the correct number of parts. See list below.

Parts List For (-)XKG-CAD14			Parts List For (-)XKG-CAD24		
Description	Part #	Qty	Description	Part #	Qty
Tie Down Brackets	602012014/TDB	4	Tie Down Brackets	602012024/TDB	1
7 ½ Ton Duct Support - 43 ½ Long (F)	602012014/VER2	1	7 ½ Ton Duct Support - 43 ½ Long (F)	602012024/VER2	1
3-6 Ton Duct Support - 38 Long (E)	602012014/VER1	1	3-6 Ton Duct Support - 38 Long (E)	602012024/VER1	1
Duct Support - 20 ¾ Long (D)	602012014/HOR1	1	Duct Support - 20 ¾ Long (D)	602012024/HOR1	1
Duct Support 39 Long (C)	602012014/HOR2	1	Duct Support 39 Long (C)	602012024/HOR2	1
Insulated Panels w/ Cutouts (H)	602012014/PAN1	2	Insulated Panels w/ Cutouts (H)	602012024/PAN1	2
Insulated Panels (G)	602012014/PAN2	2	Insulated Panels (G)	602012024/PAN2	2
Curb Long Side - 71" Long (B)	602012014/CLS	2	Curb Long Side - 71" Long (B)	602012024/CLS	2
Curb Short Side - 42 ⅝" long (A)	602012014/CSS	2	Curb Short Side - 42 ⅝" long (A)	602012024/CSS	2
¾" x 1 ¼" x 14' Gasket	602012014/4102	2	¾" x 1 ¼" x 14' Gasket	602012024/4102	2
⅜" x 13 ½" Hinge Pins	602012014/4451	4	⅜" x 23 ½" Hinge Pins	602012024/4452	4
Hardware Bag	602012014/HDW	1	Hardware Bag	602012024/HDW	1
I & O Manual	RMICRB20	1	I & O Manual	RMICRB20	1
Screw (Hex Head) #10-16 x ½"		14	Screw (Hex Head) #10-16 x ½"		14

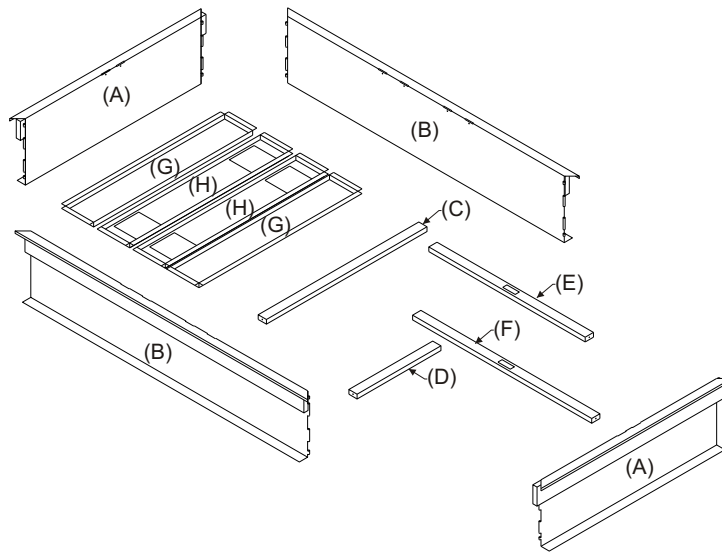


Figure 2

Step 2:
 Layout the curb pieces before assembly to insure that all the necessary pieces are included.

U.S. PATENT 5148647

INSTALLATION INSTRUCTIONS

MODEL# (-)XKG SERIES

ROOF CURBS

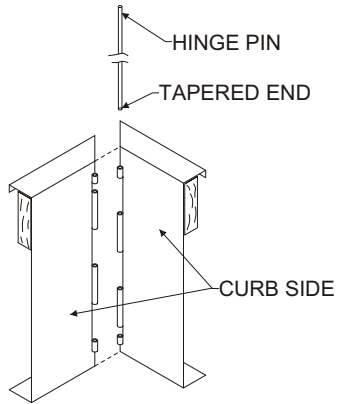


Figure 3

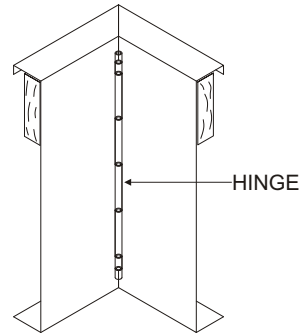


Figure 4

Step 3:

Corner Assembly: Align each curb side as shown in Figure 3. Using a hammer, drive the curb "hinge" pin down until the top of the pin is below the top of the curb as shown in Figure 4.

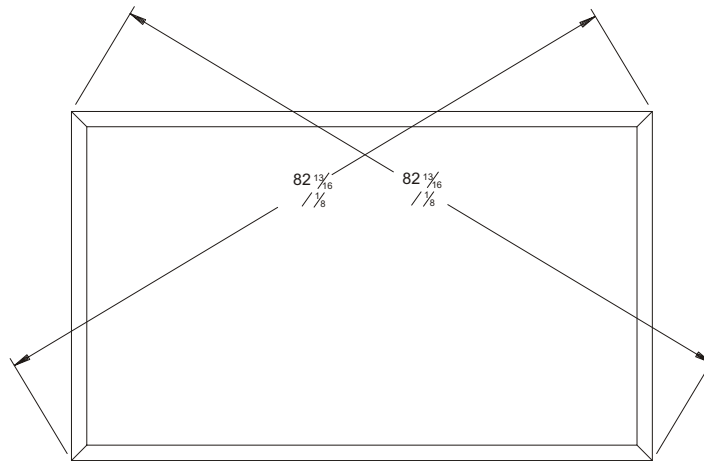


Figure 5

Step 4:

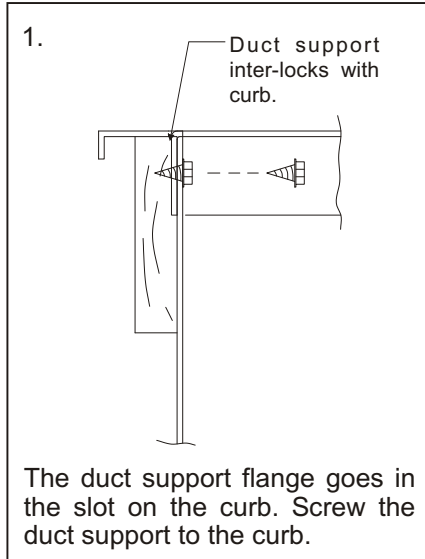
After the four corners are assembled; the curb should be checked to be sure it is in "square". Do this by measuring diagonally from each opposite corner. The two measurements should be the same for each direction as shown in Figure 5.

INSTALLATION INSTRUCTIONS

MODEL# (-)XKG SERIES

ROOF CURBS

DETAILS



The (-)XKG can now have the duct support and the insulated pans installed, unless a transition (RXMC-CB03 or CB04) is to be installed. If this is the case follow transition instruction from this point.

Step 5:

Place the duct support (C) on the curb, making sure that it is in the right location. See "DETAIL #1".

Step 6:

Place duct support (E or F) on the curb and duct support (C), making sure that it is in the right location. See "DETAIL #1 and #2".

Step 7:

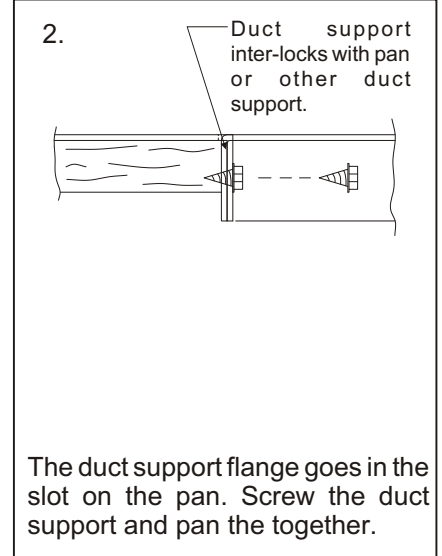
Place duct support (D) on the curb and duct support (E or F) making sure that it is in the right location.

Step 8:

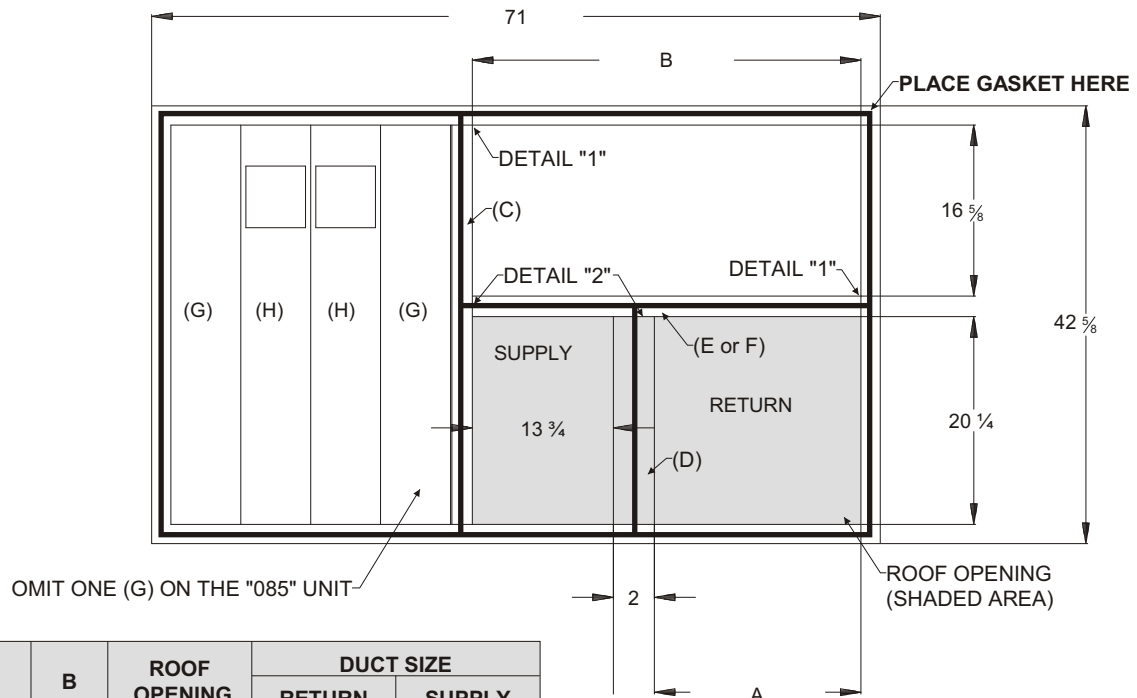
Install the insulated pans (G and H) on the curb as shown with the roof opening over the desired duct location.

Step 9:

If the curb is being assembled & moved to another location, attach the brace & pans to the curb as shown in the "DETAILS".



TOP VIEW



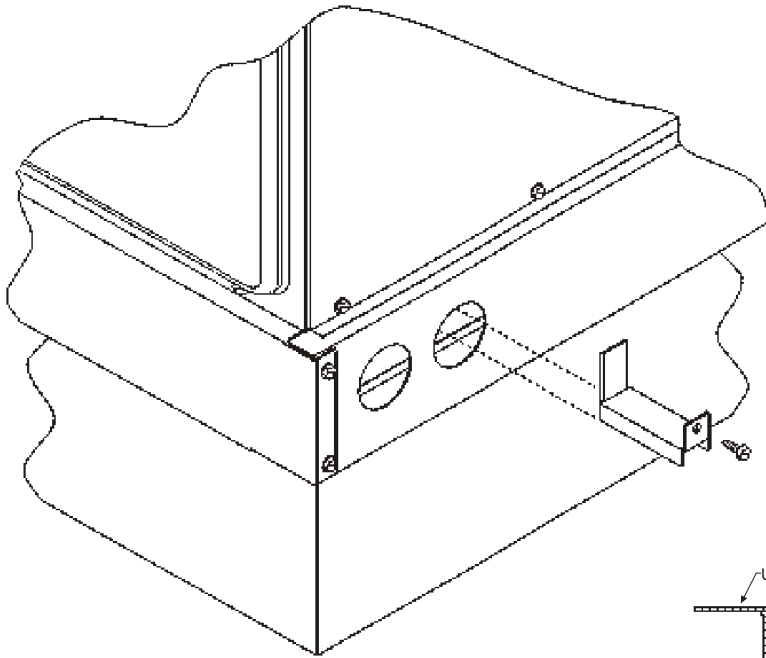
UNIT	A	B	ROOF OPENING	DUCT SIZE	
				RETURN	SUPPLY
036-072	22 ¹ / ₈	37 ⁷ / ₈	38 x 20 ¹ / ₂	21 ⁵ / ₈ x 19 ³ / ₄	13 ¹ / ₄ x 19 ³ / ₄
085	27 ⁵ / ₈	43 ³ / ₈	43 ¹ / ₂ x 20 ¹ / ₂	27 ⁵ / ₈ x 19 ³ / ₄	13 ¹ / ₄ x 19 ³ / ₄

Figure 6

INSTALLATION INSTRUCTIONS

MODEL# (-)XKG SERIES

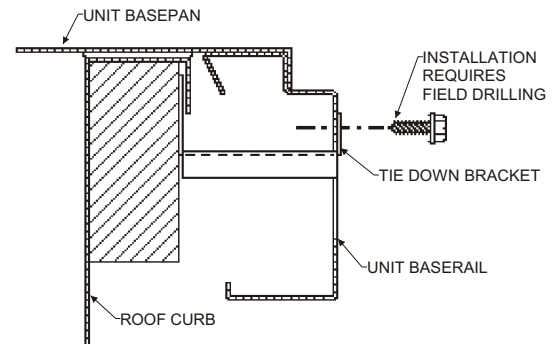
ROOF CURBS



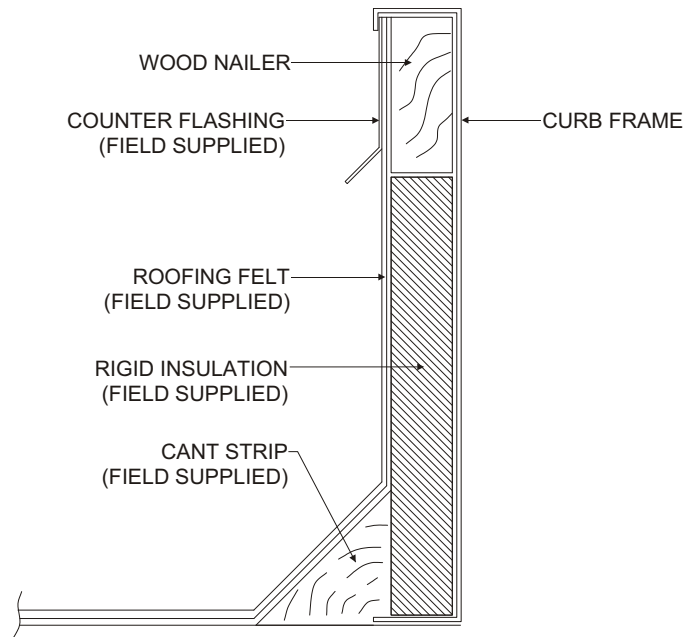
TYPICAL INSTALLATION
(4) CORNERS OF UNIT

Step 10:

To secure unit to curb, position unit on curb. Using four of the #10 x 1/2" self drilling screws, attach the tie down bracket furnished, as shown in detail. Recheck all joints to assure watertightness.



ROOF INSTRUCTIONS



INSTALLATION INSTRUCTIONS

MODEL# (-)XKG SERIES

ROOF CURBS

This Roof Curb is built to NRCA specifications and is constructed of 18 gauge galvanized steel with a full perimeter 1" X 4" wood nailer strip. Curb height is determined by the part number as listed below.

(-)XKG-CAE14 = 14 inches high
 (-)XKG-CAE24 = 24 inches high

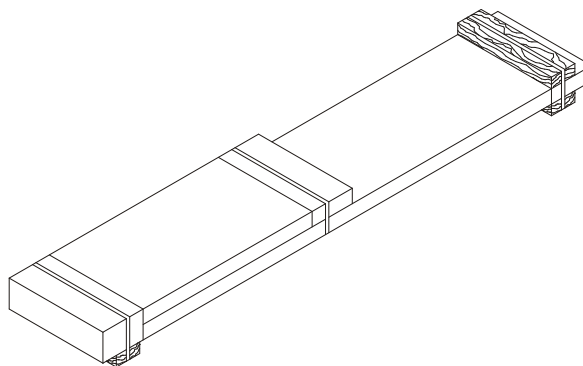


Figure 1

Step 1:

Check for the correct number of parts. See list below.

Parts List For (-)XKG-CAE14			Parts List For (-)XKG-CAE24		
Description	Part #	Qty	Description	Part #	Qty
Tie Down Brackets	602011314/TDB	4	Tie Down Brackets	602011324/TDB	1
Duct Support - 49 $\frac{5}{16}$ " Long (D)	602011314/VER	2	Duct Support - 49 $\frac{5}{16}$ " Long (D)	602011324/VER1	1
Duct Support - 20 $\frac{3}{8}$ " Long (C)	602011314/HOR1	1	Duct Support - 20 $\frac{3}{8}$ " Long (C)	602011324/HOR1	1
Duct Support 29 $\frac{3}{4}$ " Long (E)	602011314/HOR2	1	Duct Support 29 $\frac{3}{4}$ " Long (E)	602011324/HOR2	1
Curb Long Side - 88 $\frac{5}{16}$ " Long (B)	602011314/CLS	2	Curb Long Side - 88 $\frac{5}{16}$ " Long (B)	602011324/CLS	2
Curb Short Side - 53 $\frac{3}{8}$ " long (A)	602011314/CSS	2	Curb Short Side - 53 $\frac{3}{8}$ " long (A)	602011324/CSS	2
$\frac{3}{4}$ " x 1 $\frac{1}{4}$ " x 14' Gasket	602011314/4102	3	$\frac{3}{4}$ " x 1 $\frac{1}{4}$ " x 14' Gasket	602011324/4102	3
$\frac{3}{16}$ " x 13 $\frac{1}{2}$ " Hinge Pins	602011314/4451	4	$\frac{3}{16}$ " x 23 $\frac{1}{2}$ " Hinge Pins	602011324/4452	4
Hardware Bag	602011314/HDW	1	Hardware Bag	602011324/HDW	1
I & O Manual	RMICRB13R	1	I & O Manual	RMICRB13R	1
Screw (Hex Head) #10-16 x $\frac{1}{2}$ "		14	Screw (Hex Head) #10-16 x $\frac{1}{2}$ "		14

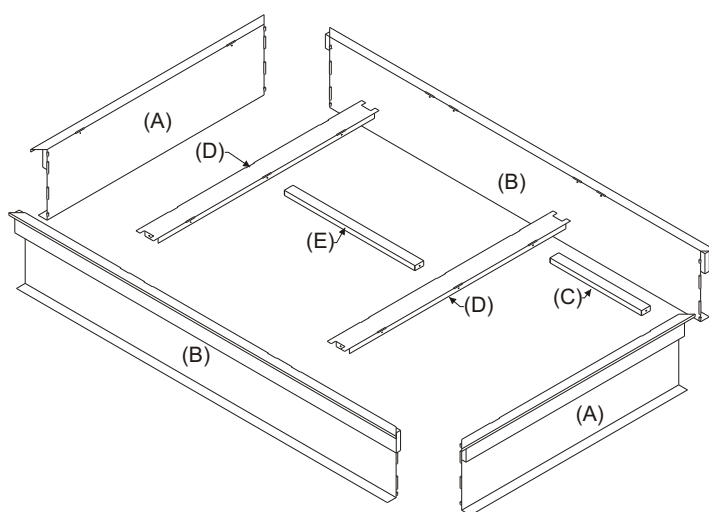


Figure 2

Step 2:

Layout the curb pieces before assembly to insure that all the necessary pieces are included.

U.S. PATENT 5148647

INSTALLATION INSTRUCTIONS

MODEL# (-)XKG SERIES

ROOF CURBS

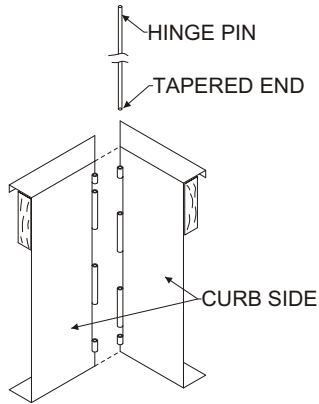


Figure 3

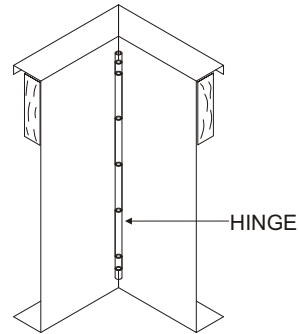


Figure 4

Step 3:

Corner Assembly: Align each curb side as shown in Figure 3. Using a hammer, drive the curb "hinge" pin down until the top of the pin is below the top of the curb as shown in Figure 4.

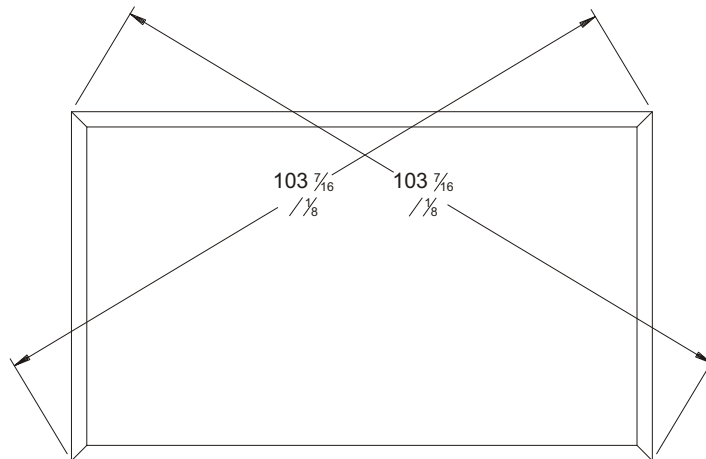


Figure 5

Step 4:

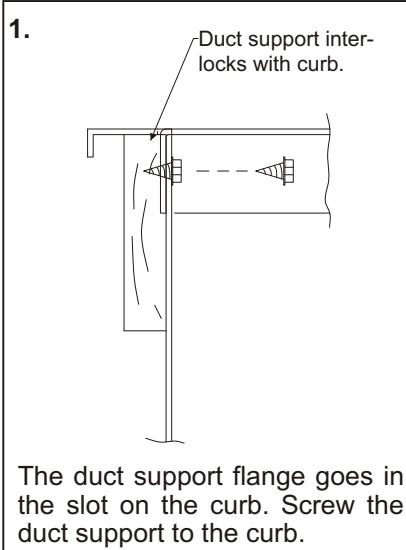
After the four corners are assembled; the curb should be checked to be sure it is in "square". Do this by measuring diagonally from each opposite corner. The two measurements should be the same for each direction as shown in Figure 5.

INSTALLATION INSTRUCTIONS

MODEL# (-)XKG SERIES

ROOF CURBS

DETAILS



The RXKG can now have the duct support installed, if a transition (RXMC-C***) is to be installed. If this is the case follow transition instruction from this point.

Step 5:
Place both duct supports (D) on the curb, making sure that it is in the right location. See "DETAIL #1".

Step 6:
Place duct support (C) on the curb and duct support (D), making sure that it is in the right location. See "DETAIL #1 and #2".

Step 7:
Install duct support (E) on the duct supports (D) as shown with the roof opening over the desired duct location. See "DETAIL #2".

Step 8:
If the curb is being assembled & moved to another location, attach the duct supports to the curb as shown in the "DETAILS".

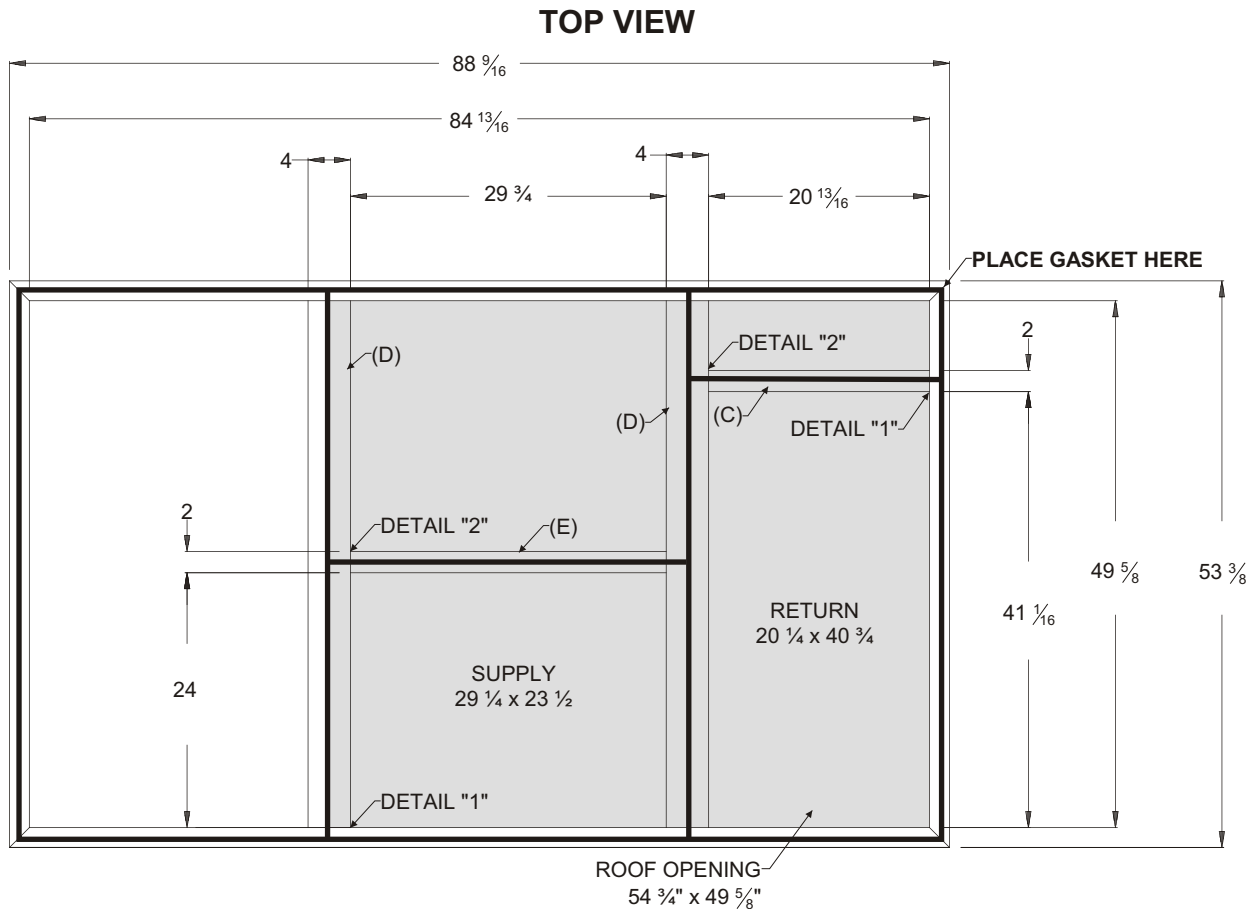
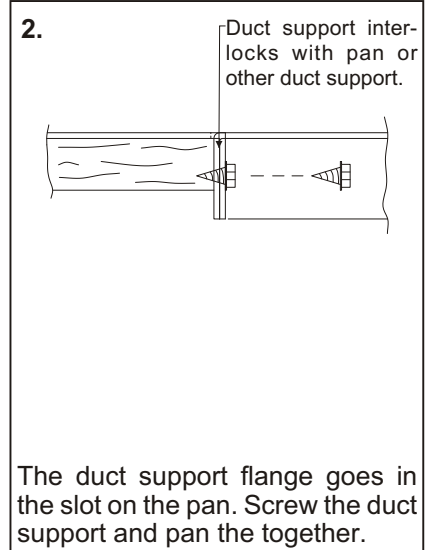
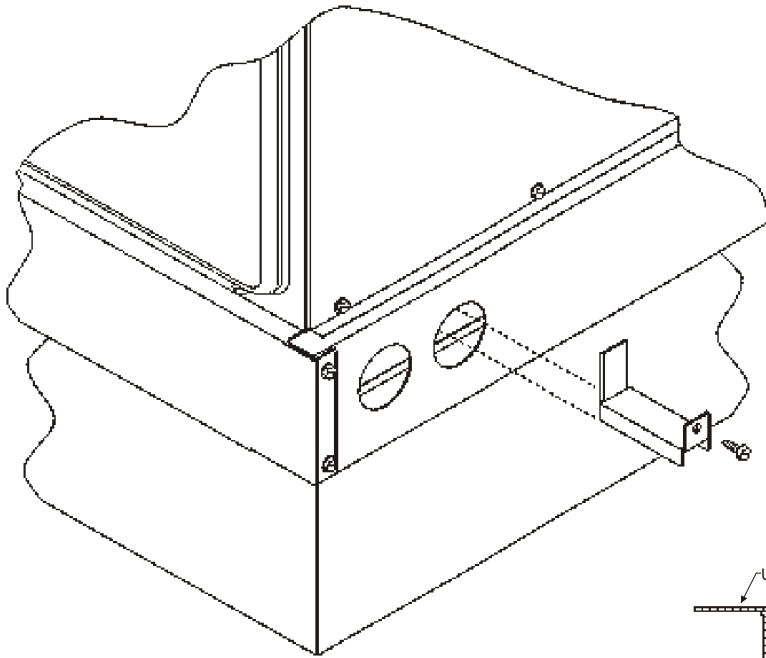


Figure 6

INSTALLATION INSTRUCTIONS

MODEL# (-)XKG SERIES

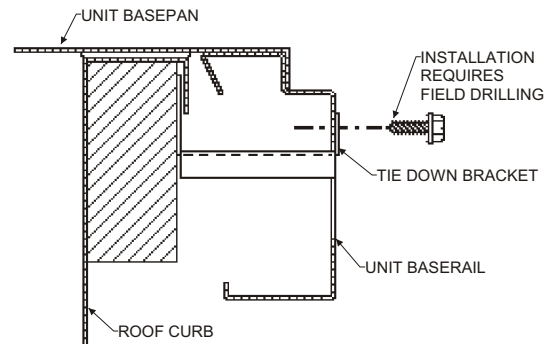
ROOF CURBS



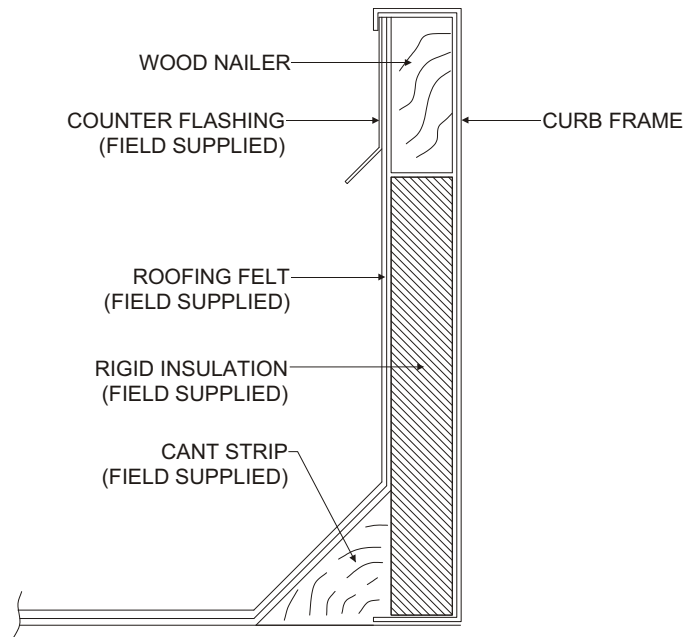
TYPICAL INSTALLATION
(4) CORNERS OF UNIT

Step 9:

To secure unit to curb, position unit on curb. Using four of the #10 x 1/2" self drilling screws, attach the tie down bracket furnished, as shown in detail. Recheck all joints to assure watertightness.



ROOF INSTRUCTIONS



INSTALLATION INSTRUCTIONS

MODEL# (-)XKG SERIES

ROOF CURBS

This Roof Curb is built to NRCA specifications and is constructed of 16 gauge galvanized steel with a full perimeter 1" X 4" wood nailer strip. Curb height is determined by the part number as listed below.

(-)XKG-CAF14 = 14 inches high

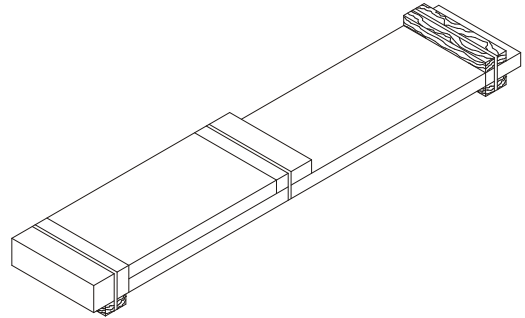


Figure 1

Step 1:

Check for the correct number of parts. See list below.

Parts List For (-)XKG-CAF14		
Description	Part #	Qty
Tie Down Brackets	602011514/TDB	4
Splice Bracket (G)	602011514/SBR	2
Duct Support - 49 $\frac{3}{8}$ " Long (E)	602011514/HOR	3
Duct Support - 42" Long (F)	602011514/VER1	1
Duct Support - 22" Long (D)	602011514/VER2	1
Curb Long Side - 70 $\frac{1}{2}$ " Long (C)	602011514/CLS	2
Curb Long Side - 70 $\frac{1}{2}$ " Long (B)	602011514/CLS	2
Curb Short Side - 53 $\frac{3}{8}$ " Long (A)	602011514/CSS	2
$\frac{3}{4}$ " x 1 $\frac{1}{4}$ " x 14' Gasket	602011514/4102	4
$\frac{3}{16}$ " x 13 $\frac{1}{2}$ " Hinge Pins	602011514/4451	6
Hardware Bag	602011514/HDW	1
I & O Manual	RMICRB15R	1
Screw (Hex Head) #10-16 x $\frac{1}{2}$ "		26

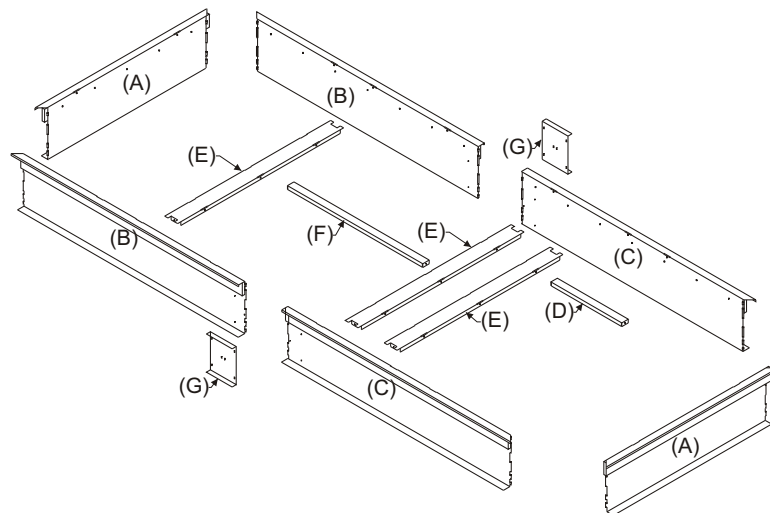


Figure 2

Step 2:

Layout the curb pieces before assembly to insure that all the necessary pieces are included.

U.S. PATENT 5148647

INSTALLATION INSTRUCTIONS

MODEL# (-)XKG SERIES

ROOF CURBS

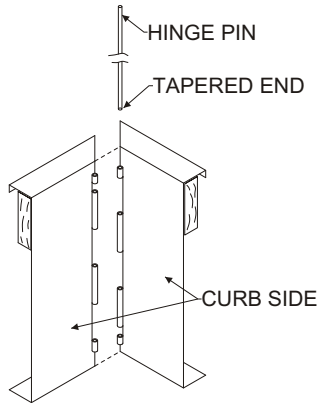


Figure 3

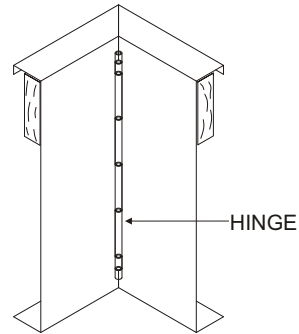


Figure 4

Step 3:

Corner Assembly: Align each curb side as shown in Figure 3. Using a hammer, drive the curb "hinge" pin down until the top of the pin is below the top of the curb as shown in Figure 4.

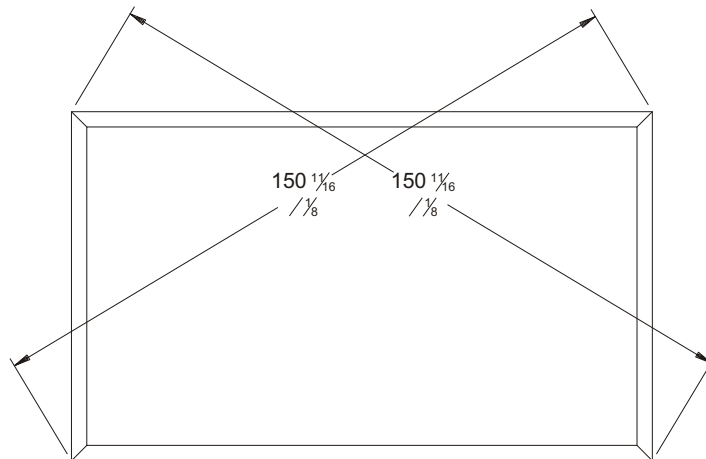


Figure 5

Step 4:

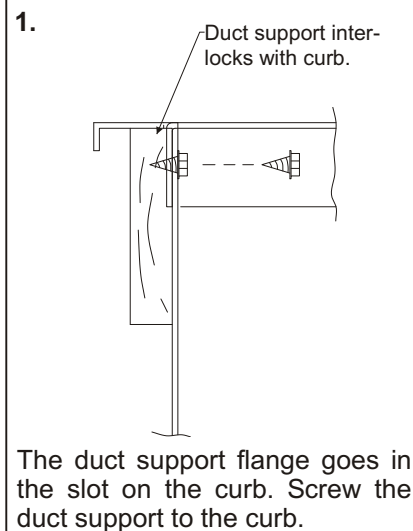
After the four corners and middle hinges are assembled; the curb should be checked to be sure it is in "square". Do this by measuring diagonally from each opposite corner. The two measurements should be the same for each direction as shown in Figure 5. Then take the splice bracket (G) and secure to outside of the middle hinges.

INSTALLATION INSTRUCTIONS

MODEL# (-)XKG SERIES

ROOF CURBS

DETAILS



The RXKG can now have the duct support installed, if a transition (RXMC-C***) is to be installed. If this is the case follow transition instruction from this point.

Step 5:

Place all three duct supports (E) on the curb, making sure that it is in the right location. See "DETAIL #1".

Step 6:

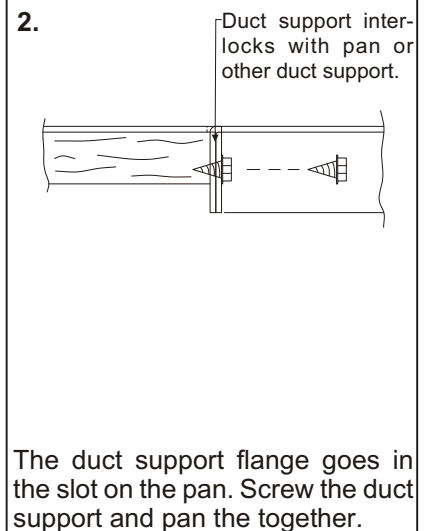
Place duct support (D) on the curb and duct support (E), making sure that it is in the right location. See "DETAIL #1 and #2".

Step 7:

Install duct support (F) on the duct supports (E) as shown with the roof opening over the desired duct location. See "DETAIL #2".

Step 8:

If the curb is being assembled & moved to another location, attach the duct supports to the curb as shown in the "DETAILS".



TOP VIEW

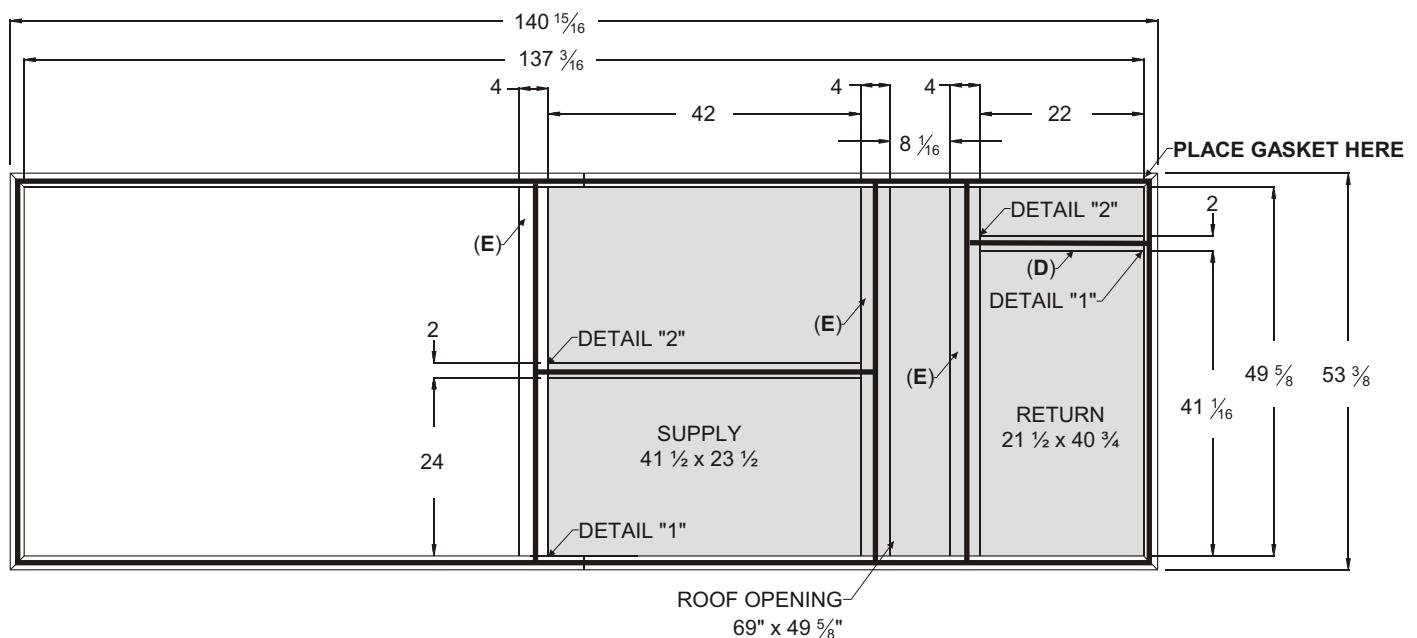
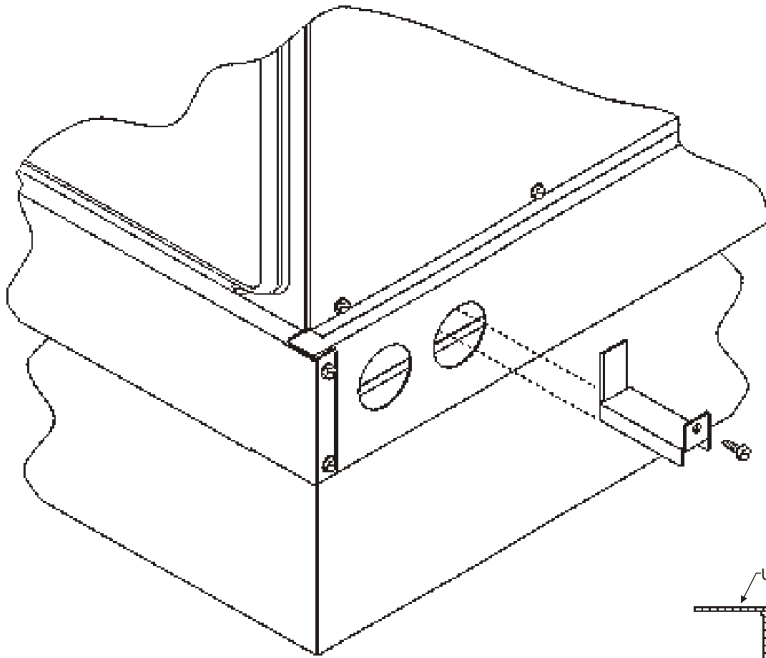


Figure 6

INSTALLATION INSTRUCTIONS

MODEL# (-)XKG SERIES

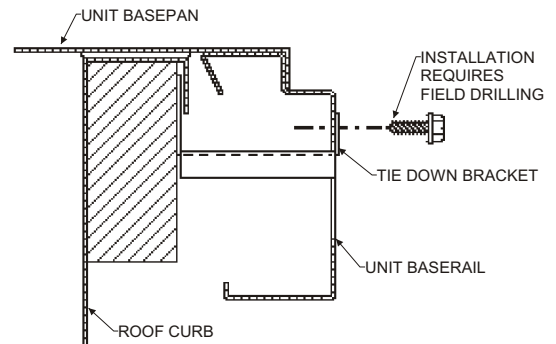
ROOF CURBS



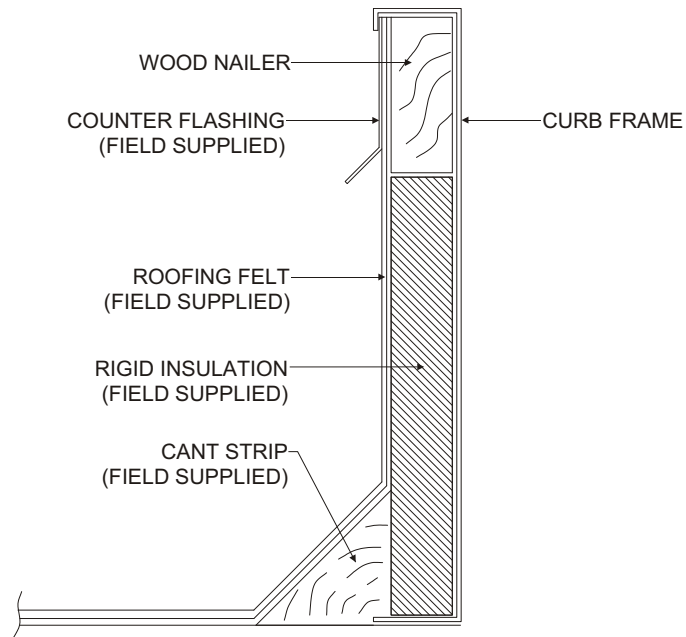
TYPICAL INSTALLATION
(4) CORNERS OF UNIT

Step 9:

To secure unit to curb, position unit on curb. Using four of the #10 x 1/2" self drilling screws, attach the tie down bracket furnished, as shown in detail. Recheck all joints to assure watertightness.



ROOF INSTRUCTIONS



Installation Manual		IM: 908
Smoke Detector		Group: MPS
		Date: January 2008
		Supersedes: None



The MQuay smoke detector is designed specifically for applications where standard external mount detectors cannot be utilized, such as air shafts, plenum spaces, or applications requiring extremely low, or no air velocity. The detector provides early detection of smoke and combustion present in the air of a duct supply, return, or both, in commercial, residential, and industrial applications.

Contents

- Specifications..... page 2
- Terminal Connections page 2
- Installation page 2

Specifications

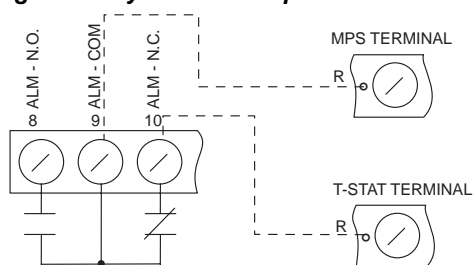
Table 1: Unit Specifications

Power Requirements	
Standby Current	60 Hz Alarm Current
24 V (ac) – 54.4 mA	24 V (ac) – 139 mA
24 V (dc) – 15 mA	24 V (dc) – 48 mA
115 V (ac) – 31 mA	115 V (ac) – 34 mA
230 V (ac) – 18 mA	230 V (ac) – 20 mA
Unit Ratings	
Alarm Contacts:	1 set form "C" rated at 10 A @ 115 V (ac) resistive 1 form "A" rated at 2 A
Trouble Contact:	1 set form "B" rated at 10 A @ 115 V (ac) resistive
Air Velocity	0 to 3000 ft/min.
Ambient Temperature:	32° to 140°F (0° to 60°C)
Humidity:	0% to 85% RH non-condensing/non-freezing
Material:	White plastic base/housing and detector
Dimensions:	6" diameter, 4" H overall/2.6" front to back
Max. Weight:	1.0 lb
Radioactive element:	Americum 241, 0.9 micro curie
Mounting:	Standard 4" square back box

Terminal Connections

Prior to connecting input power to the duct unit, determine the correct input voltage/current availability and connect to the correct terminals.

Figure 1. Dry Contact Outputs Alarm



15 A @ 124 V (ac)
10 A @ 277 V (ac)
7 A @ 30 V (dc)
1/4 HP @ 125/250 V (ac) (N.C.)
1/3 HP @ 125/250 V (ac) (N.O.)

Installation



DANGER

Moving machinery and electrical power hazards. Will cause severe personal injury or death.
Disconnect and lock off all power before servicing equipment.



CAUTION

Sharp edges on sheet metal and fasteners can cause personal injury. This equipment must be installed, operated, and serviced only by an experienced installation company and fully trained personnel.

- 1 The smoke detector can be mounted in the duct or in the return air section of the unit. If installing inside the unit, locate an area where there is a uniform, non-turbulent airflow of between 500 and 3000 ft/min (example shown in Figure 2). Other possible installation locations are inside the economizer and inside the curb.

Figure 2. Non-Turbulent Airflow Area for Mounting



- 2 Mount a 4 x 4 junction box in this non-turbulent airflow area. Twist the smoke detector onto the screws on the top of the junction box (Figure 3) to form a complete installed unit (Figure 4).

Figure 3. Mounting the Smoke Detector to Junction Box



Figure 4. Junction Box and Smoke Detector Installed



- 3 Run the wires for the 24 VAC and NC contacts back to the control panel.

Note: For Maverick units, the wires may be run with the existing exhaust fan wiring or economizer wiring.

SM-500 SERIES
CONVENTIONAL DUCT SMOKE DETECTORS
INSTALLATION AND MAINTENANCE INSTRUCTIONS

MODEL 2650-560 Ionization Type
MODEL 2650-561 Photoelectric Type

PRODUCT OVERVIEW

PRODUCT APPLICATION

The SM-500 Series Duct Smoke Detectors provide early detection of smoke and products of combustion present in the air moving through an HVAC duct in commercial, industrial and residential applications. These devices are designed to prevent the recirculation of smoke in areas by the air handling systems, fans and blowers. Complete systems may be shut down in the event of smoke detection.

The principal of operation of a duct detector is based on the Venturi effect. Two tubes extend into the HVAC duct. Air flowing through the duct is forced into the sampling tube via the air intake holes, and passes over the detector head. The air will be drawn out via the exhaust tube back into the HVAC duct. (7" exhaust tube provided in the installation kit.) When the particles of smoke suspended in the air stream reach the alarm threshold of the detector head, the unit will go into alarm.

IMPORTANT NOTE

For the correct installation, testing and maintenance of a duct smoke detector, please refer to your locally enforced fire, mechanical and/or building codes. Please also review NFPA 72 (National Fire Alarm Code) and NFPA 90A (Standard for Installation of Air Condition and Ventilation Systems). Your local Authority Having Jurisdiction (AHJ) should also be consulted.

This detector is not intended for open area protection nor should it be used for early warning detection or to replace a regular fire detection system.

Air Products and Controls Inc. provides a special U.L. 50 listed, NEMA 3R rated weatherproof enclosure separately (Model WP-1) which should be used in appropriate outdoor applications for protection from the elements. Other installations above the roof line (attics, banjo type roofs, etc.) do not require the special Model WP-1 weatherproof enclosure as long as the Air Products and Controls Inc. duct smoke detectors are not exposed to dripping water or other environmental elements. The Model WP-1 weatherproof enclosure should be used in all applications where environmental elements are a concern or local code requires a weatherproof enclosure for proper installation. All installations of our duct smoke detectors and weatherproof enclosures should be done in accordance with all applicable electrical and building codes.

PRODUCT DESCRIPTION

The SM-500 Series Smoke Detector is fitted with a mounting base that will accept an Ionization Detector Head Model # 55000-250APO or Photoelectric Detector Head Model # 55000-350APO. The duct smoke detector supports 2 sets of dry form "C" Alarm Contacts and 1 dry form "C" Trouble Contact. The trouble contact supervises the presence of the input power and removal of the detector head.

THE TROUBLE CONTACTS (TERMINALS 13, 14, 15) ARE SHOWN IN THE NON-ENERGIZED CONDITION.

The trouble contact will not operate in the event of a smoke alarm.

The SM-500 Series Duct Detector models 2650-560 and 2650-561 will operate on one of the following input voltage sources: 24VAC, 24VDC, 115VAC and 230VAC.

The duct smoke detector units are designed to operate in duct widths from 6 inches to 10 feet wide with an air velocity between 500 and 3,000 feet per minute. To verify correct installation, the pressure differential between the sampling and exhaust tubes should be measured using a Magnehelic pressure gauge or equivalent. An acceptable reading must be between 0.01 and 1.2 inches of water.

MECHANICAL INSTALLATION

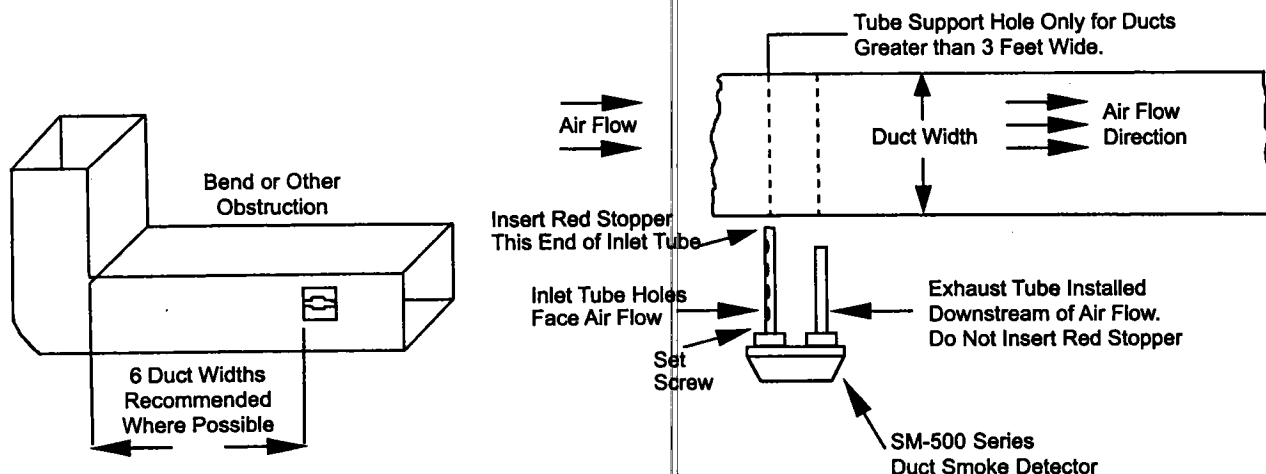
DUCT SMOKE DETECTOR LOCATION PRE-REQUISITES

This guideline contains general information on duct smoke detector installation, but does not preclude the NFPA documents listed. Air Products and Controls Inc. assumes no responsibility for improperly installed duct detectors. Please also review the NEMA *Guide for Proper Use of Smoke Detectors in Duct Applications* for additional detailed information. To determine the correct installation position for an SM-500 Series Duct Smoke Detector, the following factors should be considered.

Note: The detector is suitable for location in either the supply or return air system (or both). The detector may be mounted either horizontally or vertically, and may be mounted on the side, top or bottom of a duct. Please refer to locally enforced codes for specific requirements.

- 1) A uniform non turbulent airflow of between 500 ft/min to 3,000 ft/min. must be present in the HVAC duct. To determine the duct velocities examine the engineering specifications that define the expected velocities and/or use an Anor Model 6000P velocity meter (or equivalent).
- 2) In order to reduce the effects of stratification, duct smoke detectors, where possible, should be located a minimum of six duct widths downstream from a source of turbulence i.e. elbows, deflector plates, filters, dampers, and inlets. In installations where it is impossible to adhere to the six duct width recommendation, detectors can be installed closer but as far from inlets, bends or deflector plates as possible. Should this situation arise, check velocity readings in the duct prior to the duct smoke detector installation. Ensure the duct smoke detector pressure differential complies with the detector specifications. The pressure differential between the input sampling tube and exhaust tube for the SM-500 Series Duct Smoke Detector should be greater than 0.01 inches of water and less than 1.2 inches of water.

- 3) Identify a location for the installation of the detector that will permit access for viewing and/or serviceability.
- 4) When installing detectors in the return air side of an HVAC unit, locate them prior to the air being exhausted from the building or diluted with outside air.
- 5) When installing duct smoke detectors downstream of filters, fires occurring in the filters will be detected; but if the filters become blocked insufficient air flow through the detector will prevent the correct operation of the duct detector.
- 6) Where possible, install duct detectors upstream of air humidifiers and downstream of dehumidifiers.
- 7) To prevent false alarms, the duct detector should not be mounted in areas of extreme high or low temperatures, in areas where high humidity or condensation exists or in areas where the duct may contain gases or excessive dust.



SAMPLING TUBE ASSEMBLY

Sampling tubes are to be ordered separately in one of the 4 standard lengths. Tubes are to be selected per the following schedule:

STS-1.0	For duct widths of	Less than 1.0'
STS-2.5	For duct widths of	1.0' TO 2.5'
STS-5.0	For duct widths of	2.5' TO 5.0'
STS-10.0	For duct widths of	5.0' TO 10.0'

The standard sampling tubes are steel tubes with air intake holes drilled down the entire length of the tube. These tubes must be cut to length and must span the entire width of the duct. Sampling tubes over 3.0 feet must be supported on the opposite side of the duct. To ensure the correct operation of the sensing tube, the red end cap (provided in installation kit) must be inserted in the end of the air intake sampling tube.

DUCT PREPARATION

For ease of duct detector installation, remove mounting template from the installation kit. Remove paper backing from the mounting template and affix it to the duct at the desired location. Using the template as a guide, drill 4 mounting holes (3/32" diam.) for the 12 X 1/2" sheet metal screws packaged in the installation kit. Drill or punch 1 3/8" holes for sampling and exhaust tubes, using the template as a guide. Clean all holes.

MOUNTING DUCT SMOKE DETECTOR

Mount the housing to the duct using 4 #12 x 1/2" sheet metal screws. Once the airflow direction has been determined, insert the sampling and exhaust tubes into the connectors fitted to the back of the duct smoke detector which are equipped with set screws. These connectors will allow the tubes to be correctly orientated and secured by tightening the set screw. Ensure sampling tube is positioned so that the inlet holes are facing the airflow.

AIR SAMPLING VERIFICATION

To ensure correct operation of the duct detector, use a Magnehelic differential pressure gauge (Dwyer Model 4000 or equivalent) to determine the differential pressure between the sampling (high pressure) and exhaust (low pressure) tubes. The differential pressure between the two tubes should be greater than 0.01 inches of water and less than 1.2 inches of water.

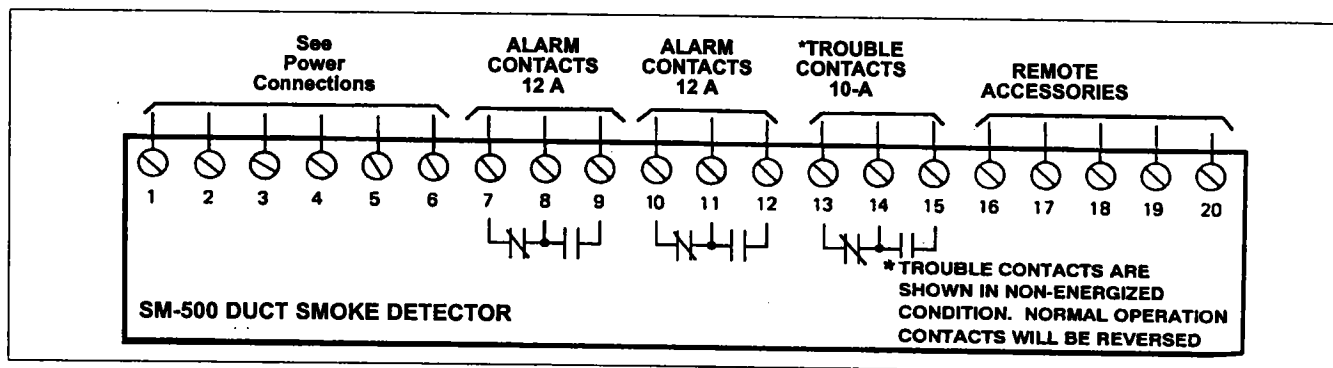
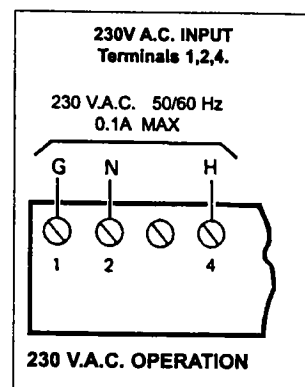
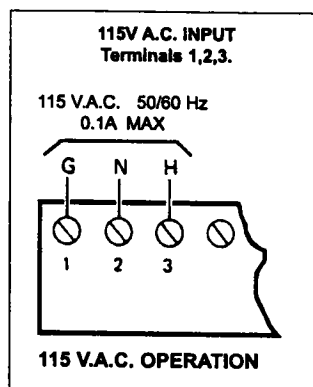
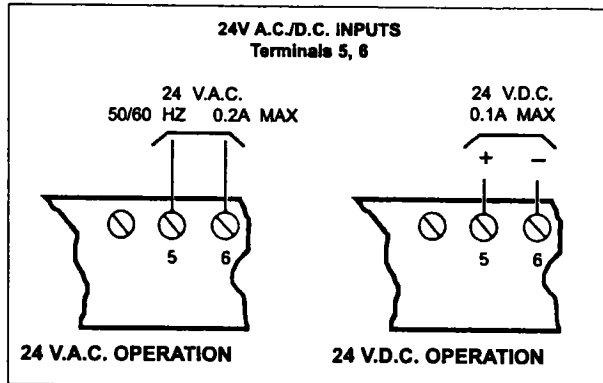
ELECTRICAL INSTALLATION

WIRING

Prior to connecting power to the SM-500 Series Duct Smoke Detector, determine the correct input voltage and ensure it is connected to the correct terminals. (Refer to power connections below)

24VAC/DC, Terminals (5, 6); **115VAC**, Terminals (1, 2, 3); **230VAC**, Terminals (1, 2, 4).

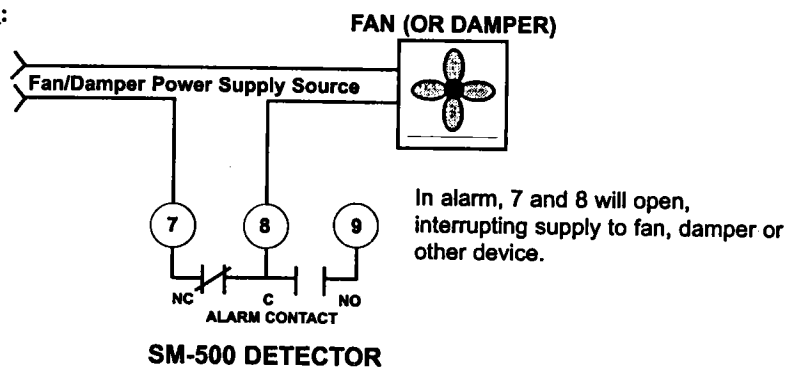
TERMINAL CONNECTIONS



CAUTION

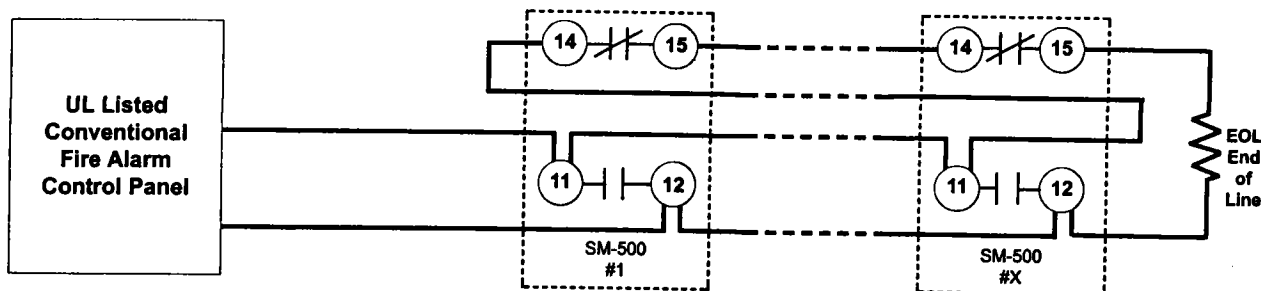
For terminals (7, 8, 9), (10, 11, 12) do not use looped wire under terminals. Break wire run to provide supervision of connections. To test the correct operation of the duct smoke detector, excluding the detector head (for head functional testing, see page 5) remove detector head and connect one of the appropriate dedicated power sources to the applicable terminals (see above). Replace detector head; the detector will be energized (the green LED will be illuminated). When pressing the test/reset button the red alarm LED will be illuminated. In the event of an alarm, certain equipment may have to be shut down. A shut down will be achieved by interrupting the supply source to that particular piece of equipment when wired as indicated below. Be sure not to interrupt the detector power supply source!

EXAMPLE:

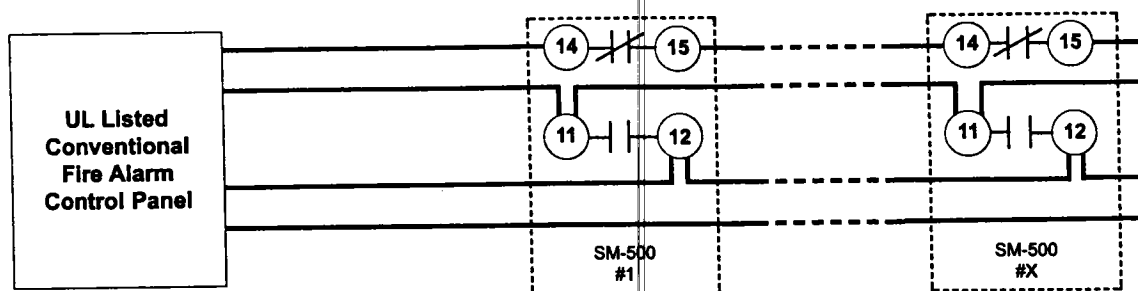


SAMPLE FIRE ALARM CONTROL PANEL WIRING - STYLE "B" / CLASS "B" IDC

(Supervised - A fault condition will not inhibit an alarm response)



SAMPLE FIRE ALARM CONTROL PANEL WIRING - STYLE "D" / CLASS "A" IDC
(Supervised - A fault condition will not inhibit an alarm response)



INTERCONNECTION WIRING FOR COMMON FUNCTIONS

NOTE: When using detector interconnection functions, we recommend that all detectors be wired to a common power source. Use of multiple power sources for interconnected detectors may cause damage to the detectors and/or may prevent the detectors from functioning properly.

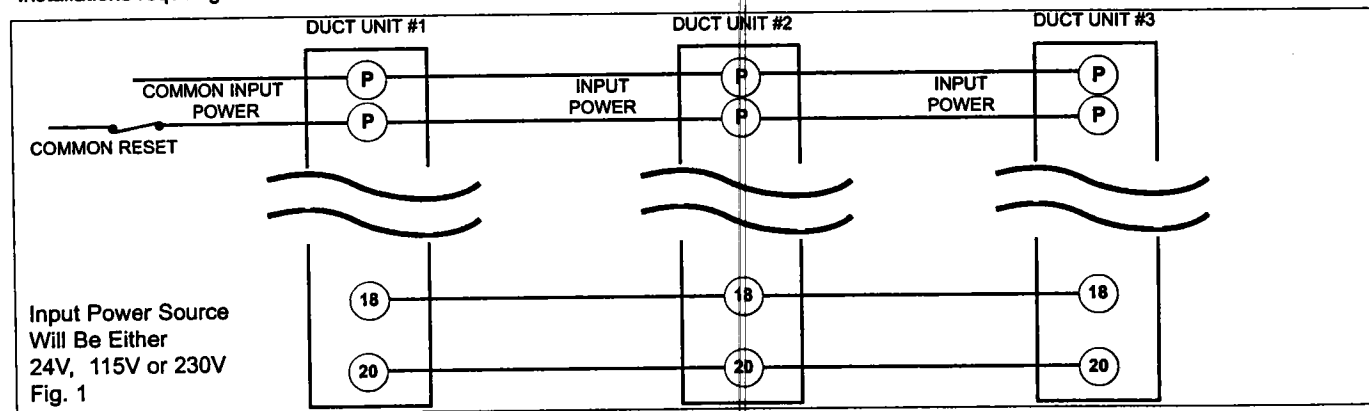
Common functions include all or one of the following: Remote common alarm indication, remote common pilot indication, remote common trouble indication (with yellow LED only), remote common reset, common shutdown, and common visual indication.

Common trouble indication (by extinguishing the green pilot LED) cannot be achieved on the SM-500 detectors. Individual remote pilot LEDs must be installed to monitor detector head or power source in the case where no yellow trouble LED is available.

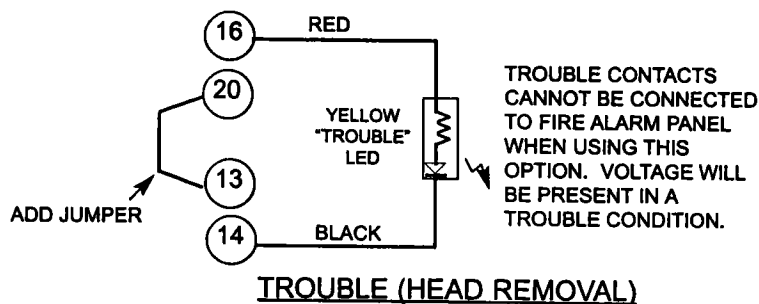
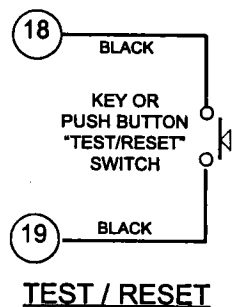
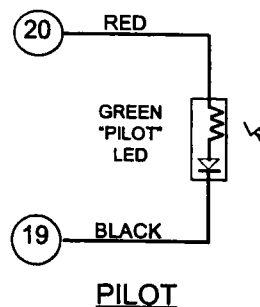
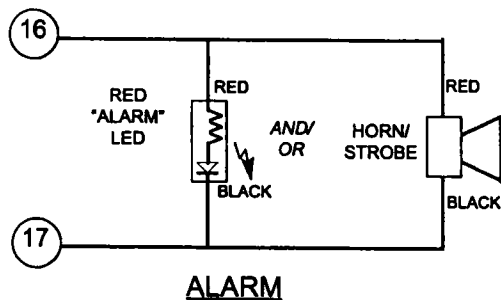
A common trouble (yellow) LED can be installed on any unit to monitor the removal of the detector head. When installing a common trouble LED which will be illuminated when any detector head is removed, a jumper with on each unit must be installed between terminals 13 and 20. Terminals 14 and 16 between each unit must be wired in series for correct common indication.

When multiple units are wired in a common function fashion and an alarm or functional test is initiated, all duct unit alarm LEDs will be illuminated. In a common alarm state only the LED of the detector head in alarm will be illuminated; all other detector head LEDs will be off.

Installations requiring common alarm shutdown must be wired as shown in Fig. 1 below:



REMOTE ACCESSORY WIRING



REMOTE ACCESSORIES APPROVED FOR USE WITH THIS DETECTOR

MS-RA	Remote Alarm	MS-KA/P/R/T	Remote Pilot, Trouble, key-operated Test/Reset Switch
MS-RA/P	Remote Alarm, Pilot	MS-F/T	Remote Trouble
MS-RA/R	Remote Alarm, push button Test/Reset Switch	MS-RH/P/A	Remote Alarm, Pilot, Horn
MS-RA/P/R	Remote Alarm, Pilot, push-button Test/Reset Switch	MS-RH/KA/P/R	Remote Alarm, Pilot, Horn, key-operated Test/Reset Switch
MS-RA/P/T	Remote Pilot, Trouble	MS-RH/KA/P/A/T	Remote Alarm, Trouble, Pilot, Horn, key-operated Test/Reset Switch
MS-RA/FT/P	Remote Pilot, Trouble, push-button Test/Reset Switch	MS-RH	Remote Alarm Horn
MS-KA/R	Remote Alarm, key-operated Test/Reset Switch	SHP24-1575R	Horn/Strobe, red housing, clear cover
MS-KA/P/R	Remote Alarm, Pilot, key-operated Test/Reset Switch	SHP24-1575O	Horn/Strobe, white housing, opaque cover
MS-RD	Remote Pilot	SHP24-1575W	Horn/Strobe, white housing, clear cover

TEST AND MAINTENANCE PROCEDURES

OPERATIONAL TESTING

To determine the correct operation of the SM-500 Series Duct Smoke Detector, ensure power is connected, that the head and cover are properly installed and that the green pilot LED is illuminated.

The red LED on the detector head will be permanently illuminated red when smoke is detected and the head is in alarm.

With the air handling unit shut down, and the clear cover removed, press and hold the **test/reset** button on the SM-500 PCB. The red alarm LED on the circuit board will be illuminated and the alarm relay outputs will change state. Using a multimeter set to OHMs (or continuity buzzer function on the meter) place the meter probes on the following terminals and ensure the contacts are closed (continuity) (8, 9), (11, 12). When the test/reset button is released these contacts will open. **CAUTION: Ensure that there is no voltage present on the contacts prior to using a multimeter set to OHMs (or continuity). Failure to remove voltage may cause risk of shock and/or damage to the multimeter. When testing or troubleshooting this detector for standard operation (as described above), always remove all HVAC and Fire Alarm Control Panel wiring from detector terminal strip.**

The trouble contacts (13, 14, 15) will not change state in the event of an alarm, operational or functional testing. The trouble contacts can be tested by rotating the detector head counter-clockwise and removing the detector head. This action will extinguish the pilot (green) LED and cause the trouble contacts to change state; (13, 14) will be closed (continuity) and (14, 15) will be open circuit. Replacing the detector head and rotating it clockwise until it locks, will cause the green pilot LED to be illuminated and the detector will be operational, terminals (13, 14) will be open circuit and (14, 15) will be closed (continuity).

FUNCTIONAL TESTING

Once operational testing is concluded the detector requires functional testing to determine the correct operation of the detector head. With unit powered up, HVAC and fire alarm systems re-connected, and detector head properly installed, you perform the following:

SMOKE TESTING

With the clear cover removed and using an approved aerosol test smoke gas (available from Air Products and Controls Inc. Part Number TG-1000), spray the test gas directly at the detector head from a distance of 12 inches for one to two seconds. **CAUTION: Spraying from a distance of closer than 12 inches can cause detector contamination.**

After 15 to 20 seconds the detector head will go into alarm, illuminating the detector head LED and causing the associated HVAC and fire alarm detector functions to operate. The alarm relays will change state and the remote accessories, if attached, will function.

If no test gas is available to conduct the testing, remove cover and blow smoke from a cotton wick or punk directly at the head to cause alarm. The alarm indicator should illuminate within one minute.

Should testing be required for simulated fire conditions, smoke bombs placed in the duct may not be suited for the particular detector head selected and installed.

Ionization Detector Head 55000-250APO utilizes a radioactive source as its means of detection and will detect smoke particles of between .1 and 1 micron in size. Photoelectric Detector Head 55000-350APO operates on the principle of light scatter and will detect smoke particles of between 1 and 10 microns in size. When purchasing smoke bombs for functional testing, ensure smoke particle sizes comply with the criteria as described above. It should be noted that a sufficient amount of smoke must be present in the duct for a sufficient amount of time to properly test detector response.

MAINTENANCE

Each installation location must be assessed on its own merits. If the protected duct is of a very dirty nature then the SM-500 Detectors will have to be checked and cleaned on a Quarterly basis or when cleaning is required. As a guideline the detector head should be cleaned every six months or as required, as per NFPA 72. The best methods of cleaning are to vacuum the detector head thoroughly or to blow the detector head out using clean, dry compressed air. Do not use chemicals to clean the detector head housing as this could contaminate the detector head and damage the casing. Sampling and exhaust tubes must be inspected and cleaned in accordance with the schedule as determined above, to allow the free flow of air through the sampling tube.

PRODUCT SPECIFICATIONS

Model Number: 2650-560 Ionization Type 24VAC/DC, 115VAC, 230VAC
2650-561 Photoelectric Type 24VAC/DC, 115VAC, 230VAC

Detector Model Number: 55000-250APO S60 Ionization Detector Head for 2650-560
55000-350APO S60 Photoelectric Detector Head for 2650-561

Power Requirements (Without Accessories):	STANDBY CURRENT		ALARM CURRENT	
	24VAC	35mA	24VAC	74mA
	24VDC	15mA	24VDC	48mA
	115VAC	25mA	115VAC	32mA
	230VAC	12mA	230VAC	16mA

Relay contact ratings and Other Specifications:

Alarm contacts:	2 form "C" rated at 10AMPS @ 115V AC resistive
Trouble contact:	1 form "C" rated at 10AMPS @ 115V AC resistive
Air velocity:	500 to 3,000 ft/min
Ambient temperature:	Model 2650-560 32°F to 155°F (0°C to 68°C) Model 2650-561 32°F to 100°F (0°C to 38°C)
Humidity:	10% to 85% R.H. no condensation
Wiring:	#14 to #22 AWG Terminals
Approvals:	Underwriters Laboratories Listed (UL268A; UROX.S2829) CSFM Listed (3240-1004:100); MEA Listed (73-92-E;Vol.24)
Material:	Gray plastic backbox with clear plastic cover
Dimensions:	L - 13 1/2", X H - 4 1/2", D - 2 1/4"
Max. net wt.:	3 lbs.
Radioactive element:	For 2650-560 (Ionization model): Americium 241, 0.9 micro curie
Do not expose to corrosive atmospheres.	

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Engineering Data	ED: 9043
	Group: MPS
	Date: January 2008
	Supersedes: None

3 Heat, 2 Cool Thermostat for Maverick I™ Units Single Stage, Multi-Stage, and Heat Pump Applications



The commercial setback digital thermostat uses microcomputer technology to provide precise time and temperature control. This thermostat offers the flexibility to design heating and cooling programs that fit building needs. This thermostat is adaptable to most residential 24 volt forced air multi-stage systems with electric or fossil fuel auxiliary and is the ultimate for comfort, convenience, and performance.

Contents

- Features page 2
- Terminals (typical connection to MPS I) page 2
- Specifications..... page 2

Features

The T170 thermostat can enhance your HVAC system by offering you the following performance features.

- Automatic heat/cool system changeover
- Fossil fuel or electric heat compatible
- Large luminescent display and industry first lighted keypad
- Permanent program memory
- Configuration menu allows keypad selection of options, no additional sub-bases required
- Selectable energy management recovery
- Onboard system and thermostat diagnostics
- Single stage models accept remote indoor sensor
- Staging models accept up to three indoor sensors and offer temperature averaging or weighted average by sensor location and program time

Specifications

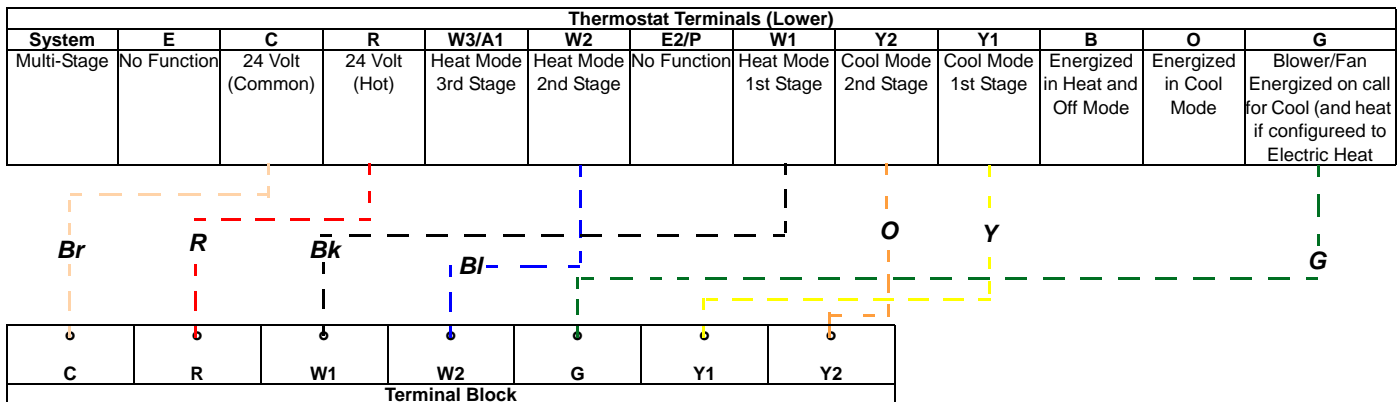
Table 1: Thermostat specifications

Electrical Rating Single Stage:	mV to 30 V (ac), NEC Class II, 50/60 Hz or DC
Electrical Rating Staging:	20 to 30 V (ac), NEC Class II
Terminal Load:	5 A per terminal, 2.5 A max. combined
Setpoint Range:	45° to 99°F (7° to 37°C)
Anticipation, Heating:	Adjustable
Anticipation, Cooling:	Adjustable
Rated Differential Single Stage:	Heat 0.5° to .5°F, Cool 0.8° to 2.2°F
Rated Differential Staging:	Heat 0.5° to .5°F, Cool 0.5° to 2.2°F
Operating Ambient:	32° to +0°F (0° to +43°C)
Operating Humidity	90% non-condensing max.
Shipping Temperature Range:	-4° to 50°F (-20° to 65°C)
Dimensions (H x W x D):	4 1/8" x 6 7/8" x 1 3/8"

Terminals (typical connection to MPS I)

Use the terminal output information below to help you wire the thermostat properly for your multi-stage system.

Thermostat Terminals (Upper)						
L	PH	D	SA	SB	SC	OT
Malfunction Light	X-10 Module Input	Not Used	Remote Sense A	Remote Sense B	Remote Sense C	Outdoor Sensor

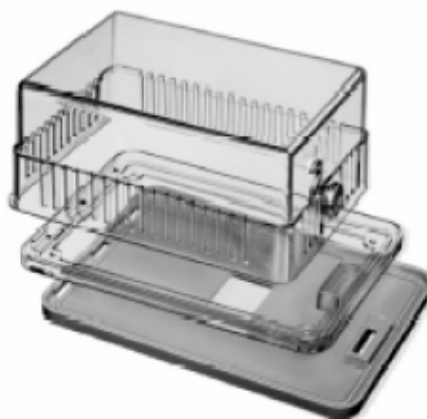


- 1 On 3 - 6 ton units, a terminal block is not supplied. Use a wirenut to extend from the leads provided in the unit to the thermostat.
- 2 W1, W2, and Y2 are optional depending upon the size and selected options of the unit.
- 3 Colors shown above are typical for the MPS I.

Group: **MPS**Date: **January 2008**Supersedes: **None**

Thermostat Guard for Maverick I™ Units

All Thermostat Types



Features

The thermostat guard can enhance your HVAC system by offering you the following features:

- Accepts all thermostat types
- Each model is furnished with one key and can be mounted vertically or horizontally
- Clear plastic models for applications that need the thermostat visible
- Furnished with a ring and/or solid wall mounting plate

Group: **MPS**Date: **January 2008**Supersedes: **None**

Remote Sensor for Maverick I™ Units

Indoor and Outdoor Sensor for Digital Thermostats



Features

The remote sensor can enhance your HVAC system by offering you the following performance features:

- Digital signal output provides superior temperature control, even over long wire runs
- No temperature variance caused by wire resistance
- Choice of styling, indoor models are interchangeable
- Perfect for securing the thermostat in on are or room while sensing temperature in the conditioned space

Specifications

Table 1: Sensor operating range specifications

Indoor Models:	40° to 99°F
Outdoor Models:	-40° to 40°F
Terminal Load:	5 A per terminal, 2.5 A max. combined
Operating Humidity Range:	0% to 90% RH (non-condensing)
Max. Distance from T-stat	300'
Recommended Wire	20 gauge, 3 conductor shielded cable

McQuay Training and Development

Now that you have made an investment in modern, efficient McQuay equipment, its care should be a high priority. For training information on all McQuay HVAC products, please visit us at www.mcquay.com and click on training, or call 540-248-9646 and ask for the Training Department.

Warranty

All McQuay equipment is sold pursuant to its standard terms and conditions of sale, including Limited Product Warranty. Consult your local McQuay Representative for warranty details. Refer to Form 933-43285Y. To find your local McQuay Representative, go to www.mcquay.com.

This document contains the most current product information as of this printing. For the most up-to-date product information, please go to www.mcquay.com.

